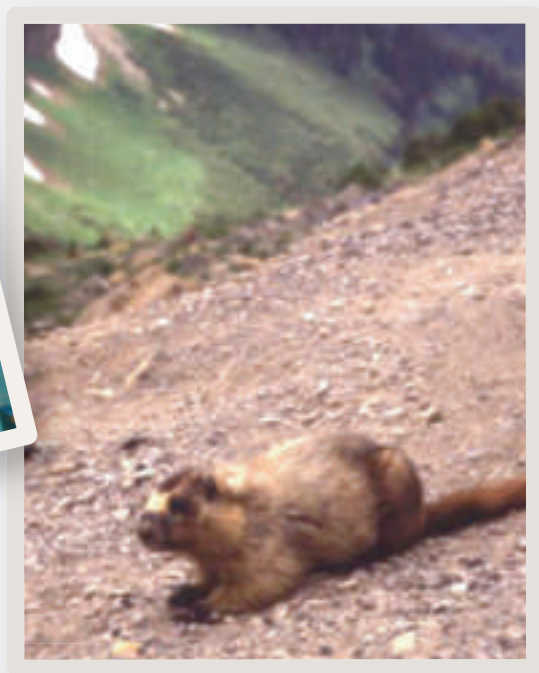




Chapter 4 Environmental Consequences





Chapter 4 Environmental Consequences

INTRODUCTION

This chapter describes the potential environmental consequences of the alternatives. The environmental consequences form the scientific and analytical basis for the comparison of the alternatives. To focus the discussion of potential consequences, specific impact topics were selected. The rationale for selecting each topic is discussed in the following section.

The chapter is organized by impact topic. Each topic section includes a discussion of the methodology used to identify and evaluate the impacts, impacts common to all alternatives, impact analysis for each alternative, and assessment of cumulative impacts. The impact analysis also examines the potential impairment to park resources and values.

Impacts are described in terms of context, intensity and duration. The context of impacts are 1) *site-specific* at the location of the action, 2) *localized* on a drainage- or district-wide level, 3) *widespread* throughout the park, or 4) *regional* outside of the park. The intensity and duration of impacts varies for each impact topic. Thresholds of impact for each topic are defined in Table 4-1.

Existing conditions are described for the *status quo/no action* alternatives. These alternatives provide the baseline conditions for evaluating changes and related environmental impacts for the remaining action alternatives. Impacts are often similar for all alternatives, but differences in impacts are identified and compared as appropriate. All impacts have been assessed assuming that mitigation measures would be implemented (see “Mitigation” in Chapter 2).

Table 4-1, Impact Threshold Definitions on the following pages defines the intensity levels (negligible, minor, moderate, major) and duration for all of the impact topics considered in this discussion. Descriptions of the impacts follow Table 4-1.

TABLE 4-1 IMPACT THRESHOLD DEFINITIONS

Impact Topic	Negligible	Minor	Moderate	Major	Duration
Water Quality	Water quality would not be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight.	Changes in water quality would be measurable, although the changes would be small and the effects would be localized.	Changes in water quality would be measurable and would be noticeable on a widespread scale.	Changes in water quality would be readily measurable, would have substantial consequences, and would be noticed on a regional scale.	Short-term – After implementation, recovery would take less than one year. Long-term – After implementation, recovery would take longer than one year or effects would be permanent.
Floodplains	Floodplains would not be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight, site-specific.	Changes in floodplains would be measurable, although the changes would be small and the effects would be localized.	Changes in floodplains would be measurable but site-specific.	Changes in floodplains would be readily measurable, would have substantial consequences, and would be noticed on a localized scale.	Short-term – After implementation recovery would take less than one year. Long-term – After implementation recovery would take longer than one year or effects would be permanent.
Soils	Effects on soils would be below or at the lower levels of detection. Any effects on soil productivity or fertility would be slight.	Effects on soils would be detectable. Effects on soil productivity or fertility would be small, as would the area affected.	Effects on soil productivity or fertility would be readily apparent, and effects would result in a change to soil character over a relatively wide area or at multiple locations.	Effects on soil productivity or fertility would be readily apparent and would substantially change the character of soil resources over a very large area.	Short-term – After implementation, would recover in less than 3 years. Long-term – After implementation, would take more than 3 years to recover or effects would be permanent.
Vegetation	No native vegetation would be affected or some individual native plants could be affected, but there would be no effect on native species populations. The effects would be on a small scale, and no species of concern would be affected.	Native plants would be affected over a relatively small area and a minor portion of a species' population.	Native plants would be affected over a relatively wide area (greater than 5 acres) or at multiple locations, and would be readily noticeable.	There would be a widespread effect on native species' populations or a considerable effect on native plant populations, including species of concern, over a very large area (greater than 10 acres).	Short-term – After implementation, would recover in less than 3 years. Long-term – After implementation, would take more than 3 years to recover or effects would be permanent.

Impact Topic	Negligible	Minor	Moderate	Major	Duration
Wildlife, including Aquatic Species	Effects would be at or below the level of detection and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.	Effects on wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population.	Effects on wildlife would be readily detectable and widespread, with consequences at the population level.	Effects on wildlife would be obvious and would have substantial consequences to wildlife populations in the region.	Short-term – After implementation, would recover in less than 1 year. Long-term – After implementation, would take more than 1 year to recover or effects would be permanent.
Threatened and Endangered Species	The alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in U.S. Fish and Wildlife Service terms.	The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. Minor effect would equate with a "may affect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "not likely to adversely affect" the species.	An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long-term consequence to individuals, population, or habitat. Moderate effect would equate with a "may affect" in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely" or "not likely to adversely affect" the species.	An individual or population of a listed species, or its critical habitat, would be noticeably affected with a vital consequence to the individual, population, or habitat. Major effect would equate with a "may affect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species or critical habitat.	Short-term – After implementation, would recover in less than 1 year. Long-term – After implementation, would take more than 1 year to recover or effects would be permanent.
Natural Sound	Effects would not be perceptible.	Effects would result in an increase in noise levels in localized areas.	Effects would result in a readily detectable, widespread introduction of noise.	Effects would result in an introduction of noise.	Short-term – Would occur during implementation. Long-term – Would be permanent

Impact Topic	Negligible	Minor	Moderate	Major	Duration
Air Quality	Changes in air quality would not be measurable.	Effects would result in a measurable change in air quality, although the changes would be small and the impacts would be localized.	Effects on air quality would be readily measurable and widespread.	Effects would be readily measurable on a regional scale, and air quality standards could be exceeded.	Short-term – Would occur during implementation. Long-term – Would be continual or permanent.
Archaeological and Ethnographic Resources	Impacts would be at the lowest level of detection — barely measurable with no perceptible consequences. For purposes of Section 106, the determination of effect would be no adverse effect.	Disturbance of a site(s) would be confined to a small area with little, if any, loss of important information potential. For purposes of Section 106, the determination of effect would be no adverse effect.	Disturbance of the site(s) would not result in a substantial loss of important information potential. For purposes of Section 106, the determination of effect would be no adverse or adverse effect.	Disturbance of the site(s) would be substantial and would result in the loss of most or all of the site and its potential to yield important information. For purposes of Section 106, the determination of effect would be adverse effect.	Short-term – Would occur only during implementation. Long-term – Would be continual or permanent.
Historic Resources	Impact(s) would be at the lowest level of detection — barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be no adverse effect.	Impact would alter a character defining feature(s) of a historic resource, but the work would be in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. For purposes of Section 106, the determination of effect would be no adverse effect.	Impact would alter a character defining feature(s) of the historic resource, diminishing the integrity of the resource, but still maintaining its eligibility for the national register. For purposes of Section 106, the determination of effect would be adverse effect.	Impact would alter a character defining feature(s) of a national historic landmark, diminishing the integrity of the resource to the extent that its designation is threatened. For purposes of Section 106, the determination of effect would be adverse effect.	Short-term – Would occur only during implementation. Long-term – Would be permanent.
Visual Resources	Effects would not result in any perceptible changes to existing viewsheds.	Effects would result in slightly detectable changes to a viewshed in a small area or would introduce a compatible human-made feature to an existing developed area.	Effects would be readily apparent and would change the character of visual resources in an area.	Effects would be highly noticeable or would change the character of visual resources by adding human-made features into a mostly undeveloped area or by removing most human-	Short-term – Would be temporary during implementation. Long-term – Would be permanent or continual.

Impact Topic	Negligible	Minor	Moderate	Major	Duration
Regional and Local Communities	Effects would be below or at the level of detection. The effect would be slight.	Effects would be detectable but would be slight.	Effects would be readily apparent.	Effects would be readily apparent and would cause substantial changes to socioeconomic conditions in the region.	Short-term – Would occur only during implementation (varies by site to a maximum of 10 years). Long-term – Would be continual or permanent.
Blackfeet and Salish-Kootenai Tribes	Effects would be below or at the level of detection.	Effects would be detectable but changes in employment rates or cultural impacts would be slight.	Effects would cause an apparent change in employment rates or would have apparent cultural impacts.	Effects would have an important impact on employment rates or park resources that have religious or cultural significance to the Blackfeet or Confederated Salish and Kootenai Tribes.	Short-term – Would occur during implementation. Long-term – Would be continual or permanent.
Visitor Use and Experience	Changes in visitor use and/or experience would be below or at the level of detection.	Changes in visitor use and/or experience would be detectable, although the changes would be slight.	Changes in visitor use and/or experience would be apparent.	Changes in visitor use and/or experience would be readily apparent and would have important consequences.	Short-term – Would occur during implementation. Long-term – Would be continual or permanent.
Energy Consumption	Effects would be below or at the level of detection. The effect would be slight.	The effects would be detectable, but impacts would be small and would not have an appreciable effect on parkwide energy consumption.	The effects would result in readily apparent widespread changes in energy consumption.	The effects would be readily apparent and would cause substantial changes to energy requirements on a regional scale.	Short-term – Would occur during implementation. Long-term – Would be continual or permanent.
Landowners In and Adjacent to Park Boundaries	Changes would be below or at the level of detection.	Changes would be detectable, although the changes would be slight.	Changes would be apparent.	Changes would be readily apparent and would have important consequences.	Short-term – Would occur during implementation. Long-term – Would be permanent.

IMPACT TOPICS CONSIDERED

The criteria for selecting impact topics was based on federal laws, regulations and executive orders, National Park Service management policies, knowledge of resources, and concerns expressed by the public.

Natural Resources

- **Water Quality**
Water quality in Glacier National Park is very high, and some of the commercial services take place on or near bodies of water in the park. Actions in the park that affect water quality could have downstream effects as well.
- **Floodplains**
Floodplains in proximity of Many Glacier, Swiftcurrent, Apgar Village, Lake McDonald, Rising Sun and Two Medicine developed areas are assessed to determine 1) effects of the alternatives on floodplains, or 2) risks posed by floodplains on human safety and park developments in accordance with Executive Order 11988 and National Park Service guidelines for implementing the executive order.
- **Soils**
Many of the soil types in Glacier National Park limit construction or development. Soils are also a valued natural resource that supports valued vegetation and wildlife habitat in the park. Soils are assessed to determine how they would be affected by the alternatives.
- **Vegetation**
Wide variations in elevation, climate and soil promote vegetation diversity in Glacier National Park. The park supports over 1,100 species of vascular plants and at least 870 non-vascular plants, including many rare and sensitive species. The park's plant communities and broad ecological communities are important park resources that could be affected by actions that would change human use and development patterns in the park.
- **Wildlife, Including Aquatic Species**
Glacier National Park is noted for its abundant wildlife and as a refuge for sensitive and rare species. Habitat for over 300 terrestrial wildlife species is found within the park, which is also a corridor for wildlife interaction and migration. Alternatives are evaluated to determine impacts on wildlife and how actions may change human use and development patterns in the park.

As aquatic habitats outside the park become more degraded, the importance of protecting waters inside the boundaries of the park becomes increasingly significant for aquatic species. Actions proposed by the alternatives are evaluated to determine impacts on aquatic resources in Glacier National Park.

- **Threatened and Endangered Species**
The Federal Endangered Species Act requires an examination of impacts on all federally listed threatened or endangered species. Glacier National Park supports populations of these species that are federally listed as threatened: the bald eagle, grizzly bear, Canada lynx, bull trout, and the endangered gray wolf.

- **Natural sound**
Natural sound and the opportunity to experience solitude are valued resources in Glacier National Park. The public has expressed concern that commercial services would affect noise levels in the park, and the actions of the proposed alternatives are evaluated to determine impacts on the noise level in the park.
- **Air Quality**
Glacier National Park is a Class I air quality area under the Clean Air Act, which requires federal land managers to protect park air quality and air quality-related values. Impacts on air quality due to increased visitation, recreational use and regional effects on the park are of concern. Changes in visitor use patterns could also affect the park's air quality. Actions of the alternatives are therefore assessed to determine impacts on air quality in the park.

Cultural Resources

- **Historic, Archaeological and Ethnographic Resources**
Many structures and buildings in Glacier National Park are listed in the National Register of Historic Places and there are six national historic landmarks in the park. Past and ongoing studies have found Glacier National Park to be rich in archaeological resources, and many ethnographic resources exist in the park that are associated with cultural and religious practices and that are still used by American Indian tribes today.
- **Visual Resources**
The establishment of Glacier National Park was rooted in the preservation and appreciation of the scenic resources of the area. Because the park is highly valued for its breathtaking views, the alternatives are analyzed for their effects on scenic and visual resources.

Socioeconomic Resources

- **Regional and Local Communities**
Glacier National Park contributes to the local and state economies in various ways, including tourism, employee and operational expenditures. The alternatives are analyzed for their effects on regional and local communities.
- **The Blackfeet and the Confederated Salish and Kootenai Tribes**
The park has sacred and cultural significance for the Blackfeet and Salish-Kootenai Tribes. The effects of the alternatives on these resources are analyzed.
- **Visitor Use and Experience**
Providing opportunities to experience, understand, appreciate and enjoy natural and cultural resources is one of the fundamental purposes of Glacier National Park. Many actions considered in this *Draft Commercial Services Plan and Draft Environmental Impact Statement* could affect patterns of visitor use and the type and quality of the visitor experience. The alternatives are therefore assessed to determine their impact on them.
- **Energy Consumption**
Energy requirements of the alternatives are assessed in accordance with the National Energy Policy Act.

- **Landowners In and Adjacent to Park Boundaries**
There is private land inside and adjacent to Glacier National Park's boundary and developed areas. Effects on private land are analyzed for each of the alternatives.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

- **Wetlands**
Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, impacts on wetlands. A contractor conducted site surveys during the summer of 2001 (DeArment 2001) to determine whether there are wetlands within the Apgar Village, Lake McDonald, Rising Sun, Two Medicine, Many Glacier, or Swiftcurrent developed areas that would be affected by the alternatives. All proposed actions in the developed areas and all necessary and appropriate services would avoid wetland areas, and wetlands would not be affected.
- **Wild and Scenic Rivers**
The North Fork and Middle Fork of the Flathead River, which border the west and south side of Glacier National Park, are designated as part of the Flathead Wild and Scenic River under the Wild and Scenic Rivers Act. The act requires the preservation of the free-flowing condition and water quality of wild and scenic rivers. Commercially guided rafting would continue to be provided on the Middle Fork and North Fork of the Flathead River under the conditions of a permit issued by the U.S. Forest Service under the authority of the Wild and Scenic River Act and would have no new impact on the Flathead Wild and Scenic River corridor. The commercial services plan would have no additional impact on wild and scenic rivers; therefore, this topic was dismissed from further analysis in this document.
- **Prime and Unique Farmlands**
In 1980, the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service as prime or unique. There are no "prime or unique farmlands" in Glacier National Park.
- **Environmental Justice**
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to analyze the impacts of park actions on minority populations. The project would not have health or environmental effects on minorities or low-income populations or communities. Decisions regarding who receives these concession contracts would be made during the contract award process. Therefore, environmental justice was dismissed as an impact topic in this document.

CUMULATIVE IMPACTS

The Council on Environmental Quality regulations, which implement the National Environmental Policy Act, require the assessment of cumulative impacts in the decision making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over time.

Because the impacts between individual alternatives under the commercial services plan would not be substantially different, cumulative impacts for all alternatives were analyzed for each impact topic under one heading. Cumulative impacts were determined by combining the impacts of the commercial services plan with other past, present and reasonably foreseeable future actions.

Over the past fifteen years, concessioners and the National Park Service have undertaken a variety of rehabilitation projects on the concessioner facilities in Glacier National Park. For example, at Lake McDonald Lodge, projects include the rehabilitation of the lodge building and improvements to the access drive, rehabilitation work on the lodge dormitories, cabins, auditorium and employee recreational facility, and upgrades to lodge electrical panels, fire and alarm systems, and sewage lines. At Swiftcurrent Motor Inn, improvements include upgrades of the sewer lines, shower facilities, handicapped accessibility in the motels and lobby, remodeling of the campstore and upgrades to electrical wiring and lighting throughout the complex. At Many Glacier, actions include upgrades to the electrical service, stabilization of one wing of the hotel, improvements to the alarm and sprinkler system and replacement of a bunkhouse for the horse concession. At Two Medicine, a ticket booth was added for the boat concession and repairs made to the roof and skylight at the campstore. At Apgar, parking was added, the Village Inn office expanded to enlarge a manager's quarters and a horse concession ticket office was added. While this is not an exhaustive list, it provides examples of the types of actions that have been taken on facilities in the recent past.

Other actions by the National Park Service include instituting vehicle size restrictions on the Going-to-the-Sun Road in 1992, rehabilitation to utility systems around the park, and continuing road rehabilitation on the Camas, Many Glacier and Going-to-the-Sun Roads.

To assess cumulative impacts, other past, ongoing or reasonably foreseeable future actions within or near the park were identified. Ongoing and reasonably foreseeable future actions are described in the following table, and an analysis of cumulative impacts is discussed in subsequent sections for each impact topic.

**TABLE 4-2 PAST, ONGOING AND REASONABLY FORESEEABLE FUTURE ACTIONS
ASSESSED FOR CUMULATIVE IMPACTS**

Action	Geographic Location	Activity	Schedule
Glacier National Park			
Repairs to critical sections of the Going-to-the-Sun Road	Glacier National Park	Various repairs to the Going-to-the-Sun Road as needed and as funding becomes available.	Ongoing
Stabilization and rehabilitation of the Belton Bridge	Glacier National Park	Replace abutments and wingwalls, rehabilitate concrete arch, and install a new timber structure and decking.	2001–2003
Water system rehabilitation for Apgar and Park Headquarters	Glacier National Park	Convert to a fully pressurized system, implement water conservation measures, install new distribution pipelines and additional water storage tank for fire.	2003
Construction of West Side Discovery Center	Glacier National Park	Design and construct West Side Discovery Center for visitor information and orientation north of the T intersection.	Not funded. Date to be determined.
West Glacier entrance station improvements	Glacier National Park	Construct new kiosks, improve access lanes and parking, and provide visitor orientation pull-off.	Not funded

Action	Geographic Location	Activity	Schedule
Installation of a micro-hydro electric power generator at the Goat Haunt Ranger Station complex	Glacier National Park	Installed a micro-hydro electric power generator.	2002
Construction of a fire cache and housing in Two Medicine	Glacier National Park	Construct a wildland fire cache and a duplex employee housing unit.	2003
Construction of a fire cache in the St. Mary administrative area	Glacier National Park	Construct a wildland fire cache.	2003
Going-to-the-Sun Road rehabilitation	Glacier National Park	Rehabilitate the Going-to-the-Sun Road between West Glacier and St. Mary to address drainage deficiencies, slope stability, retaining walls, arches, guardwalls and tunnels, and deteriorating roadway pavement.	2004
Many Glacier Hotel stabilization: Phases I-VII	Glacier National Park	Emergency stabilization and code upgrades to address deteriorated condition of the hotel.	Ongoing
Historic rehabilitation of Sperry and Granite Park Chalets	Glacier National Park	Sperry: restored to full service and new toilet facilities installed. Granite Park is unfunded.	1997-2001 Unfunded.
West Glacier wastewater rehabilitation	Glacier National Park	Rehabilitate wastewater system to improve treatment.	2003
Dock rehabilitation	Glacier National Park	Rehabilitate selected boat docks for the physically challenged.	2003
Many Glacier sewage rehabilitation	Glacier National Park	Exact solution to be determined.	Not funded Some work completed.
Montana Department of Transportation			
US 2 reconstruction	Columbia Falls to Badrock Canyon and Badrock Canyon to Hungry Horse	Reconstruct highway; 2-lane, 2-way traffic maintained.	2003; 2005–2006
US 2 reconstruction	Badrock Canyon	Reconstruct highway; blasting delays possible.	Within the next 10 years.
US 2 reconstruction	Blackfeet Reservation	Reconstruct highway; 2-lane, 2-way traffic maintained.	2002–2009
US 89 reconstruction	Blackfeet Reservation	Reconstruct highway; 2-lane, 2-way traffic maintained.	2002–2012
US 93 reconstruction	Kalispell, Whitefish	Reconstruct highway; 2-lane, 2-way traffic maintained.	2003–2006
Two Medicine Bridge replacement	US 2 crossing of Two Medicine River	Replace bridge and improve approach.	2003
U.S. Forest Service			
Timber salvage and resource rehabilitation	Flathead National Forest	Timber salvage, logging, forest rehabilitation associated with forest fire	2002–2005
Canyon Creek Bridge replacement	Flathead National Forest, east side of Hungry Horse Reservoir	Bridge replacement	2004
Trail construction and reconstruction	Lewis & Clark National Forest, near southeastern border of Glacier National Park	Trail reconstruction, trail establishment and switchback construction	2002–2003
Montana State Forest			
Timber salvage and resource rehabilitation	Coal Creek State Forest	Timber salvage, logging, forest rehabilitation associated with forest fire	Ongoing

IMPAIRMENT OF PARK RESOURCES AND VALUES

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid or minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that would harm the integrity of the park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's General Management Plan or other relevant National Park Service planning document.

Impairment may result from National Park Service activities in managing the park, visitor activities or activities undertaken by concessioners, contractors and others operating in the park. Determinations on impairment are made in subsequent sections for each impact topic.

ANALYSIS OF IMPACTS

In the analysis that follows, when a necessary and appropriate service and/or an alternative A is not affected by an impact topic, it is omitted from the discussion.

WATER QUALITY

Methodology

Current water quality conditions were assessed through consultation with Glacier National Park staff. Alternatives were evaluated on the basis of data and other information gathered from annual monitoring reports and current literature reviews. Data from field visits was used along with information from other environmental assessments and environmental impact statements.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Water quality would not be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight.



- *Minor:* Changes in water quality would be measurable, although the changes would be small and the effects would be localized.
- *Moderate:* Changes in water quality would be measurable and would be noticeable on a widespread scale.
- *Major:* Changes in water quality would be readily measurable, would have substantial consequences, and would be noticed on a regional scale.
- *Short-term:* After implementation, recovery would take less than one year.
- *Long-term:* After implementation, recovery would take longer than one year or effects would be permanent.

Impacts Common to All Alternatives

All alternatives involving construction and/or repair would have minor to negligible, localized, short-term, adverse impacts on water quality from an increase in sedimentation due to the erosion of disturbed soils. The greatest impacts on water quality would occur where construction or ground disturbance is adjacent to streams, rivers or lakes. Mitigation measures would prevent most of the erosion and contain sediment within work areas. Wastewater from all new or rehabilitated buildings would be connected to the existing sanitary sewage systems. Removing woody debris from Snyder Creek could increase sediment and affect water quality. Removing debris during low water periods would result in negligible to minor adverse, short-term impacts on water quality. Increasing the height of the berm at Rising Sun would have no effect on water quality because any material used would be imported to the site. Stabilizing the bluff where historic guest cabins are located above Rose Creek would cause minor short-term, adverse impacts from sedimentation during construction. However, reducing erosion over the long term would reduce sediments associated with water runoff. This action would have a minor long-term, positive impact on water quality. Coordination with the U.S. Army Corps of Engineers would be undertaken and permits acquired for this action.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action.** The water and sewage systems at Granite Park Chalet are in poor condition and are not functionally adequate for the level of use. Maintaining the existing water and sewage systems under alternative A would result in minor adverse impacts to groundwater.
- **Alternatives B (Preferred) and C.** These alternatives would improve the water and sewage systems at Granite Park Chalet by replacing and expanding restrooms and providing potable water, resulting in minor positive impacts on water quality.

Guided Day Hiking (Cultural/Natural/Recreational)

- **Alternative A – Status Quo/No Action.** Maintaining current guided day hiking services under alternative A would continue to contribute to erosion along trails, thereby increasing sedimentation in nearby streams, rivers and lakes. Adverse impacts on water quality from alternative A would be negligible and localized.

- **Alternative B (Preferred).** Alternative B reduces the potential for soil erosion and consequent sedimentation in streams, rivers and lakes. Negligible adverse impacts on water quality would also occur under this alternative from soil erosion.

Guided Underwater Diving Tours

- **Alternative A – Status Quo/No Action.** This alternative would have no impact on water quality.
- **Alternative B (Preferred).** Providing guided underwater diving activities would negligibly increase sedimentation from erosion at lakeshore staging areas, turbidity from diving activities. Adverse impacts on water quality from guided underwater diving tours would be localized.

Public Showers

- **Alternative A – Status Quo/No Action.** This alternative would have no impact on water quality.
- **Alternative B (Preferred).** Constructing new shower facilities would cause some sedimentation from possible ground disturbance associated with construction, resulting in negligible short-term, adverse impacts on water quality.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action.** Maintaining current interpretive boat tours on Lakes McDonald and Josephine as well as St. Mary, Two Medicine, Swiftcurrent and Waterton Lakes would continue to result in negligible adverse impacts on water quality from increased turbidity in shallow waters. This action would also result in minor adverse impacts because of point source pollution from petroleum products.
- **Alternative B (Preferred).** Adverse impacts from **added** tour boat services on Lake McDonald and Two Medicine would not dramatically increase. Extending the present dock at Apgar to 40 feet would have minor short-term, adverse impacts on water quality from driving pilings into the lakebed. Alternative B would have negligible to minor adverse impacts on water quality overall.

Horseback Riding and Horse Packing Services

- **Alternative A – Status Quo/No Action (Preferred).** Continuing current horseback riding and horse packing services would continue to cause sedimentation from erosion and nutrient loading from horse manure into streams, rivers and lakes. Overall adverse impacts would be minor to moderate and widespread.
- **Alternative B.** Maintaining the Apgar stables as a base for packing operations while discontinuing trail rides from the stables, and maintaining all other current horseback riding and horse packing services would result in the same minor to moderate adverse impacts as alternative A.
- **Alternative C.** Adding horseback riding in the Two Medicine and St. Mary areas would increase erosion and nutrient loading, resulting in the same adverse impacts as alternative A.
- **Alternative D.** Impacts for this alternative would be the same as under alternative A, except that removing the Lake McDonald stables would greatly reduce runoff from the horse stables in that area. Soils in the Lake McDonald area have porous subsoil, which allows wastes to move rapidly to either the surface or groundwater (Dutton 2001). Therefore, eliminating runoff from horse stables in the Lake McDonald area would cause a localized reduction in nutrient loading and a

positive effect on water quality. Expanding facilities at the Apgar stables, however, would increase nutrient loading from runoff in that area. Nonpoint pollution control measures would be implemented to mitigate impacts, and impacts would be minor to negligible. Sedimentation from constructing new housing at the Apgar stables would have negligible, adverse, short-term impacts on water quality. Eliminating day riders from the McDonald Valley would have positive long-term effects on water quality.

Overall, alternative D would have minor, widespread, adverse impacts as well as a minor positive impact on water quality in the Lower McDonald Creek drainage.

Alternatives A and B would result in an approximately equal amount of adverse impacts on water quality. Alternative C would affect water quality in a greater overall area than would alternatives A, B or D. Alternative D would have both positive and adverse impacts on water quality, with the least overall adverse impact on water quality.

Conclusion

Granite Park Chalet alternative A would continue to have minor, localized, long-term, adverse impacts on water quality due to poor water and sewage system conditions. Alternatives B and C would improve existing water and sewage system conditions, resulting in a minor, localized, long-term, positive impact on water quality.

Although impacts on water quality under alternative B for guided day hiking services would be slightly less than under alternative A, both alternatives would increase sedimentation. This increase would result in overall negligible, localized, long-term, adverse impacts on water quality.

Alternative A for guided underwater diving tours would have no impact on water quality. Alternative B would have overall negligible, localized, long-term, adverse impacts on water quality from pollution.

Alternative A for public showers would have no impact on water quality. Alternative B for public showers would have negligible, site-specific, short-term, adverse impacts on water quality from sedimentation.

Continuing to provide current boat tours and transportation (boat taxi) under alternative A would continue to have negligible, localized, long-term, adverse impacts on water quality. These impacts would be the same under alternative B.

Alternatives A and B for horseback riding and packing services would have minor to moderate, localized, long-term, adverse impacts due to sedimentation from erosion and nutrient loading from horse manure. Impacts for alternative C would be the same as for alternative A, with the addition of localized impacts in the Two Medicine and St. Mary areas. Alternative D would have the same adverse impacts as alternative A. The removal of the Lake McDonald stables, elimination of day rides in the Upper McDonald Valley and expansion of the Apgar stables would have an overall minor, localized, long-term, positive impact in the Lower McDonald Creek drainage.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning

documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Apgar Village Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Baseline improvements and repairs would have minor, short-term adverse impacts during implementation.



Sedimentation would occur during the stabilization of the Lake McDonald shoreline and result in minor, short-term, adverse impacts on water quality. However, stabilizing the shoreline would reduce sedimentation from erosion over the long-term, resulting in a minor, localized, positive impact on water quality.

Formalizing and hardening pedestrian pathways along the shoreline would reduce a negligible amount of lakeside soil and vegetation available to filter sediments and pollutants in runoff from the surrounding developed area. Developing hardened pathways along the shoreline would increase localized runoff and would have a negligible adverse impact on water quality.

- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative.

Removing parking and creating a pedestrian green space in Area I along Lake McDonald would increase the amount of vegetation and soil available to filter sediments and pollutants in water runoff from the surrounding pavement, resulting in a minor positive impact on water quality.

Proposed new parking lots in Areas I and II would be designed to move parking away from the side of Apgar Loop Road. The total amount of non-point source pollution from vehicles would not increase significantly. Hardened, impermeable surfaces reduce the amount of soil and vegetation available to filter runoff, thereby increasing pollution; however, drainage control measures would capture and dissipate runoff to minimize impacts on water quality. Adverse impacts on water quality would be minor and long-term.

- **Alternative C.** Applicable impacts described for alternatives A and B remain the same under this alternative with the following exceptions.

Removing the Village Inn and associated parking from the lakeshore in Area I and restoring the site would increase the amount of vegetation and soil available to filter sediments and pollutants in water runoff from the developed area, resulting in a moderate positive impact on water quality. Although the site would be restored, the area along the lakeshore would be rehabilitated for public use. Consequently, adverse impacts from developing hardened paths along the shoreline would also be negligible since a greater amount of vegetation and soil in the surrounding area would be available to filter sediments and pollutants in water runoff.

Constructing new lodging units and parking in Area II to replace the Village Inn would not increase sediments or pollutants. Moving guest lodging away from the lakeshore would increase the amount of available vegetation and soil to filter sediments and pollutants from water runoff

before it reaches the lakeshore. Also, drainage control measures would be implemented to capture and dissipate runoff and minimize impacts on water quality. Although the new lodging would continue to have minor adverse impacts associated with sediments and pollutants in water runoff, overall impacts from moving development away from the lakeshore would be positive.

- **Conclusion.** Although alternative A would have positive and negative impacts on water quality, the overall impact would be minor to negligible, localized, long-term and adverse.

Alternative B would also have both positive and negative impacts on water quality. However, overall impacts from new development in the Apgar Village developed area would be minor, localized, long-term, and adverse.

Alternative C would have the greatest amount of new development but would have the least negative impact on water quality over the long-term because development is moved away from the lake. This action, and restoring the vegetation and soil would result in an overall minor, localized, long-term, positive impact on water quality.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Baseline improvements and repairs would have minor to negligible, short-term, adverse impacts on water quality during implementation.

Formalizing and hardening pedestrian pathways throughout Areas I and II would increase the amount of hardened surfaces in the area. Sediments and pollutants associated with increased water runoff from expanded hardened surfaces would cause negligible to minor, adverse impacts on water quality.

- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Constructing additional parking in Areas I and II would increase the amount of localized runoff due to additional hardened, impermeable surface area. New parking would also increase non-point source pollution from vehicles. With the implementation of drainage control measures to capture and dissipate runoff, adverse impacts would be minor.

Constructing a new housing village for employees in Area II would increase sediments and pollutants associated with water runoff. Drainage control measures would capture and dissipate runoff to minimize impacts on water quality, and adverse impacts on water quality would be minor and long-term.

Removing the existing Coffee Shop parking lot and Girls' Dormitories 1 and 2 from Area II and replacing them with open green spaces would increase the amount of soil and vegetation available

to filter sediments and pollutants from water runoff, having a negligible to minor, positive impact on water quality.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B remain the same under this alternative with the following exceptions.

Constructing a new access road and parking adjacent to the guest cabin units in Area II would increase the amount of hardened surfaces in the area. Sediments and pollutants associated with increased water runoff from expanded hardened surfaces would cause minor adverse impacts on water quality.

- **Conclusion.** Overall, alternative A would have a negligible to minor, localized, long-term, adverse impact on water quality from developing hardened paths.

Although alternative C would have the greatest amount of new development and increase in hardened surfaces, alternatives B and C would both have overall minor, localized, long-term, adverse impacts on water quality.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained, and maintenance of existing visitor facilities would be ongoing. Baseline improvements and repairs would have minor to negligible, short-term, adverse impacts during implementation.

Formalizing and hardening pedestrian pathways throughout Areas I, II and III would increase the amount of hardened surfaces in the Rising Sun developed area. Sediments and pollutants associated with increased water runoff from expanded hardened surfaces would cause negligible to minor, adverse impacts on water quality.

- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Constructing five new cabins with parking in Area I, as well as a new employee dormitory with parking and an outdoor recreation facility would increase sediments and pollutants associated with water runoff. Drainage control measures would capture and dissipate runoff to minimize impacts, and impacts would be negligible.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B remain the same under this alternative with the following exceptions.

Constructing ten new cabins and associated parking, as well as two new employee dormitories, including an outdoor recreation facility in Area I would increase localized runoff due to new development and additional impermeable surface area. Drainage control measures would capture

and dissipate runoff to minimize impacts on water quality, and adverse impacts on water quality would be negligible.

Reinforcing the existing earth berm in Area II would curtail erosion over the long-term, reducing sediments associated with water runoff and resulting in negligible positive impacts on water quality.

- **Conclusion.** Overall, alternative A would have a negligible to minor, localized, long-term, adverse impact on water quality from developing hardened paths.

Although alternative B would have both positive and negative impacts, overall impacts would be negligible, localized, long-term and adverse from development and increased hardened surfaces in the Rising Sun developed area.

Alternative C would have the greatest overall positive and negative impacts on water quality. Although alternative C would result in more development and a greater increase in hardened surfaces than would alternative B, overall adverse impacts from development under this alternative would also be negligible, localized and long-term. There would be more erosion-reducing actions under alternative C than under alternative B, and positive impacts on water quality from reduced sediments in water runoff would be minor, localized and long-term.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Baseline improvements and repairs would result in minor to negligible, short-term adverse impacts during implementation.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative.

Constructing hardened, accessible walkways throughout the Two Medicine developed area, including a pedestrian bridge over Appistoki Creek and accessibility upgrade to the ticket booth office, would increase the amount of hardened surfaces in the area. Sediments and pollutants associated with increased water runoff from expanded hardened surfaces would cause minor adverse impacts on water quality.

The comfort station would be removed and a new one constructed at a new location. This action and constructing a service road and service/bus parking area for the General Store would also have minor adverse impacts from an increase in localized runoff due to the additional hardened, impermeable surface area; however, drainage control measures would be used to minimize impacts on water quality.

Restoring historic landscape features in front of the General Store, including the former comfort station site, would increase the availability of soil and vegetation to filter sediments and pollutants from water runoff. Because a relatively small area would be restored, this action would have negligible positive impacts.

- **Conclusion.** Overall, alternative A would have minor to negligible, localized, short-term, adverse impacts on water quality from baseline repairs and improvements.

Alternative B would have an overall minor, localized, long-term, adverse impact on water quality due to increased hardened surfaces in the developed area.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Baseline improvements and repairs would have minor to negligible, short-term adverse impacts during implementation.

Formalizing and hardening pedestrian pathways throughout Areas I and II would increase the amount of hardened surfaces in the Many Glacier developed area. Sediments and pollutants associated with increased water runoff from expanded hardened surfaces would cause negligible to minor adverse impacts on water quality.

- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Improving pedestrian access to and around the hotel could increase hardened surfaces in the area. Increased runoff from additional hardened surfaces would cause negligible to minor adverse impacts.

Developing a hardened trail around Swiftcurrent Lake would increase sediments and pollutants associated with water runoff from the additional hardened, impermeable surface area, causing minor adverse impacts on water quality.

See the Swiftcurrent Developed Area below for impacts on water quality from constructing additional employee accommodations in the Swiftcurrent area.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B remain the same under this alternative with the following exceptions.

Constructing a new dormitory and outdoor recreational facility in Area II would increase sediments and pollutants associated with water runoff. Because drainage control measures would be implemented to minimize impacts on water quality, adverse impacts on water quality would be minor and long-term.

- **Conclusion.** Overall, alternative A would have a negligible to minor, localized, long-term, adverse impact on water quality from developing hardened paths.

Although alternative B would have both positive and negative impacts, development and increased hardened surfaces would result in minor, localized, long-term and adverse overall impacts.

Alternative C would have the greatest overall adverse impact on water quality. Constructing a new dormitory with an outdoor recreational facility under this alternative would result in more development and hardened surfaces in the Many Glacier developed area than would alternative B. However, because sediments and pollutants associated with runoff would not increase dramatically, adverse impacts for alternative C would also be minor, localized and long-term.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Baseline improvements and repairs would have minor to negligible, short-term adverse impacts during implementation.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative.

Formalizing the trail network throughout Areas I, II and III to better separate vehicle and pedestrian circulation could increase hardened surfaces in the Swiftcurrent developed area. Sediments and pollutants associated with increased water runoff from expanded hardened surfaces would cause negligible to minor adverse impacts on water quality. Drainage control structures would be used to minimize impacts.

Constructing a fourth motel in Area I, three new cabin rings on the former Bath House and Motel 4 site in Area II, and approximately five new cabins to complete the existing cabin rings in Area II would increase sediments and pollutants associated with water runoff. Because drainage control measures would be implemented to capture and dissipate runoff and minimize impacts, adverse impacts on water quality would be minor.

Realigning the west access road in Area III, constructing additional visitor parking, and formalizing employee parking adjacent to the Restaurant/Store would develop additional hardened surfaces resulting in minor adverse impacts from increased runoff. Drainage control measures would be used to minimize impacts. Creating a new trailhead at the main parking area and a trail to the existing trailhead would cause increased sedimentation from erosion, but would have a negligible impact on water quality.

- **Alternative C.** Applicable impacts described for alternatives A and B remain the same under this alternative with the following exceptions.

This alternative would construct new employee dormitories, showers, and indoor and outdoor recreation facilities. It would expand employee parking, construct a new cabin ring for employee housing and fill in the existing employee cabin ring with one cabin. These actions would increase sediments and pollutants associated with water runoff from new development and the increased amount of hardened surfaces. However, drainage control measures would be implemented, and impacts on water quality would be minor.

- **Conclusion.** Overall, alternative A would have minor to negligible, localized, short-term, adverse impacts on water quality from baseline repairs and improvements in the Swiftcurrent area.

Alternatives B and C, overall, would result in roughly the same amount of impact. Both alternatives would have an overall minor, localized, long-term, adverse impact on water quality from new development and the increased amount of hardened surfaces.

There would be no significant adverse impacts on water resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of water resources as a result of the implementation of any of the alternatives.

Cumulative Impacts

In areas throughout and adjacent to the park, water resources have been affected by a variety of past actions such as development, and are being affected by present actions such as rafting and boating services. Some reasonably foreseeable actions are road and bridge construction and improvement projects, and U.S. Forest Service timber salvage operations and trail construction outside the park, as well as the Going-to-the-Sun Road rehabilitation project inside the park. These future actions would have localized impacts on water quality. The combined impact of all the actions and any of the alternatives would be a minor long-term, regional, adverse cumulative effect on water resources.

FLOODPLAINS

Methodology

Floodplain literature reviews for the six developed areas (Apgar Village, Lake McDonald, Rising Sun, Two Medicine, Many Glacier and Swiftcurrent) were conducted by a contractor during the fall of 2001. The National Park Service Water Resources Division surveyed the areas in the summer of 2002 to determine where floodplains occur and to what extent floods would occur. The floodplain literature reviews showed that all of the developed areas are adjacent to streams or lakes, and existing facilities might be located within a floodplain.

Thresholds of impact are defined in Table 4.1.



- *Negligible:* Floodplains would not be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight and site-specific.
- *Minor:* Changes in floodplains would be measurable, although the changes would be small and the effects would be localized.
- *Moderate:* Changes in floodplains would be measurable, but would be site-specific.
- *Major:* Changes in floodplains would be readily measurable, would have substantial consequences, and would be noticed on a localized scale.
- *Short-term:* After implementation, recovery would take less than one year.
- *Long-term:* After implementation, recovery would take longer than one year or effects would be permanent.

Impact Analysis For Necessary and Appropriate Services Alternatives

Other Services

None of the other services alternatives would affect floodplains.

Apgar Developed Area

- **Alternative A – Status Quo/No Action.** There would be no effects on floodplains because the developed area is outside the 100-year floodplain of McDonald Creek. Stabilization of the shoreline would have no effect on the floodplain.
- **Alternative B (Preferred).** There would be no effects on floodplains since the developed area lies outside the 100-year floodplain of McDonald Creek.
- **Alternative C.** There would be no effects on floodplains.

Lake McDonald Developed Area

- **Alternative A - Status Quo/No Action.** Since no additional development is proposed under this alternative, there would be no additional effects on the floodplain of Snyder Creek.
- **Alternative B.** Removal of dormitories located on the west bank of Snyder Creek would have minor long-term, beneficial effects on the floodplain by removing structures from the floodplain and providing unimpeded flows of flood waters.
- **Alternative C (Preferred)** would have the same effects as Alternative B.

Rising Sun Developed Area

- **Alternative A - Status Quo/No Action.** Raising the berm and stabilizing the bank would have a moderate localized, long-term, adverse impact on the floodplain by controlling flood flows.
- **Alternative B** would have the same effects as Alternative A.
- **Alternative C (Preferred)** would have the same effects as Alternative A.

Two Medicine Developed Area

- **Alternative A - Status Quo/No Action.** Maintaining the present channel of Appistoki Creek would have a moderate localized, long-term, adverse impact on the floodplain by controlling flood flows.
- **Alternative B** would have the same effects as Alternative A.

Many Glacier Developed Area

- **Alternative A - Status Quo/No Action.** No effects would occur to the floodplain of Swiftcurrent Lake.
- **Alternative B** would have the same effects as Alternative A.
- **Alternative C (Preferred)** would have the same effects as Alternative A.

Swiftcurrent Developed Area

- **Alternative A - Status Quo/No Action.** No effects on the floodplain would occur.
- **Alternative B (Preferred).** No effects on the floodplain would occur.
- **Alternative C.** No effects on the floodplain would occur.

Conclusion

Proposed improvements and actions taken to protect human life and property at Lake McDonald, Rising Sun, Many Glacier and Two Medicine would have no effect at Many Glacier and moderate, localized, long-term effects at Rising Sun and Two Medicine. There would be minor beneficial, long-term effects at Lake McDonald.

Cumulative Impacts

Actions of maintaining development in floodplains combined with past actions would result in continued control and floods in these areas, resulting in a major adverse, long-term impact.

There would be no significant adverse impacts on floodplains whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of floodplains as a result of the implementation of any of the alternatives.

SOILS**Methodology**

Current soil conditions were assessed through consultation with Glacier National Park staff and professional soils scientists. Alternatives were evaluated on the basis of data and other information gathered from the



following sources: “Soils of Glacier National Park,” prepared by Barry Dutton (2001); Geographic Information System (GIS) thematic layers available through the park’s GIS coordinator, interviews with technical experts, monitoring reports and current literature reviews. Data from recent field surveys were used along with information from other compliance documents.

The following criteria were used to assess impacts: soil removal, soil profile mixing, soil compaction, soil erosion, soil contamination and soil restoration.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Effects on soils would be below or at the lower levels of detection. Any effects on soil productivity or fertility would be slight.
- *Minor:* Effects on soils would be detectable. Effects on soil productivity or fertility would be small, as would the area affected.
- *Moderate:* Effects on soil productivity or fertility would be readily apparent, and effects would result in a change to soil character over a relatively wide area or at multiple locations.
- *Major:* Effects on soil productivity or fertility would be readily apparent and would substantially change the character of soil resources over a very large area.
- *Short-term:* After implementation, would recover in less than 3 years.
- *Long-term:* After implementation, would take more than 3 years to recover or effects would be permanent.

Impacts Common to All Alternatives

For alternatives involving construction and/or repair, compaction from equipment and erosion would result in negligible site-specific, short-term, adverse impacts during construction. In all alternatives that involve the construction of parking lots, paving and construction would have negligible long-term, site-specific, adverse impacts on soils. Stabilizing the bluff where historic guest cabins are located above Rose Creek would curtail erosion in this area, resulting in minor positive impacts. Reinforcing the existing earth berm in Area II would curtail erosion, resulting in minor positive impacts on soils.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action.** Alternative A would continue to have minor adverse impacts on soils from trampling and soil hardening caused by visitor movement between the chalet and the drinking water source.
- **Alternative B (Preferred).** The replacement of the water line and installation of a new water tank would temporarily disturb approximately 4,250 square feet of previously disturbed soils. Placement of a new toilet facility and the replacement of associated components would permanently disturb approximately 634 square feet of soil. Repairing the existing infiltration gallery and replacing the water line, water tank and toilet facilities would reduce system maintenance, thereby decreasing the amount of soil disturbance and potential soil contamination. Overall impacts on soils would be minor, long-term and positive.

- **Alternative C** would have the same impacts as alternative B. In addition, the construction of a new gray water system would result in slightly more ground disturbance. System placement would result in 1,500 additional square feet of soil disturbance.

Guided Day Hiking (Cultural/Natural/Recreational)

- **Alternative A – Status Quo/No Action.** Continuing current guided day hiking services would result in continued adverse impacts on soils due to increased soil compaction and erosion, and decreased soil productivity along trails. Large guided hiking groups contribute to greater erosion and compaction because of the tendency groups to step off the trail when gathering around the guide, or to allow others to pass by.
- **Alternative B (Preferred)** would place group size limits on guided day hikes and on the number of trips per day on high-traffic trails. This would reduce the potential for soil erosion and compaction surrounding the trail. Alternative B would have a less negative impact than alternative A.

Firewood Sales

- **Alternative A – Status Quo/No Action** would have no impact on soils because firewood sales do not occur in campgrounds.
- **Alternative B (Preferred).** Providing firewood sales in specific campgrounds in the visitor services zone would have no effect on soils unless new facilities were constructed to facilitate sales. The placement of new facilities would likely be limited to existing developed areas and would cause negligible adverse impacts from construction.

Public Showers

- **Alternative A – Status Quo/No Action** would have no impact on soils.
- **Alternative B (Preferred).** New shower facilities would likely be constructed in relatively small areas that are within previously developed areas at or near campgrounds in the visitor services zone. This action would cause negligible adverse impacts from disturbance due to construction and the permanent placement of structures on the soil surface.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action.** Continued soil disturbance and turbidity in shallow waters, as well as negligible soil contamination from petroleum products would persist at Lakes McDonald and Josephine, and St. Mary, Two Medicine, Swiftcurrent, and Waterton Lakes.
- **Alternative B (Preferred).** This alternative would have the same impacts as alternative A, but with increased adverse impacts on Lake McDonald due to added tour boat services from Apgar Village to Lake McDonald Lodge.

Horseback Riding and Horse Packing Services

- **Alternative A – Status Quo/No Action (Preferred).** Continuing current horseback riding and horse packing services would continue to erode and compact soil, and decrease productivity along trails, resulting in minor adverse impacts. Nonpoint source pollution from horse stables would

continue to contribute to soil contamination.

- **Alternative B.** Maintaining the Apgar stables as a base for packing operations while discontinuing trail rides from the stables, and maintaining all other current horseback riding and horse packing services would result in the same minor adverse impacts as alternative A, except that the elimination of commercial horseback riding day trips from the Apgar stables would reduce impacts along Apgar area trails.
- **Alternative C.** Adding horseback riding in the Two Medicine and St. Mary areas would result in the same adverse impacts as alternative A, but with a slight increase in erosion and compaction, and decrease in soil productivity along trails in the Two Medicine and St. Mary areas.
- **Alternative D.** Impacts would be the same as under alternative A, except that removing the Lake McDonald stables and discontinuing day rides in the Upper McDonald Valley would reduce soil contamination in that area, resulting in a positive impact. Soils in the Lake McDonald area have a porous subsoil, which allows wastes to move rapidly to surface or groundwater (Dutton 2001). Consequently, these soils are not well suited for horse use due to the high potential of nitrogen in soils from horse manure. Expanding the Apgar stables and possibly constructing additional housing could result in minor adverse impacts from some increased soil disturbance due to construction and permanent placement of structures in that area.

Conclusion

Alternative A for Granite Park Chalet would continue to have minor, site-specific, long-term, adverse impacts due to soil contamination and periodic disturbance from maintenance. Generally, although alternative B would result in slightly more ground disturbance than alternative C, both alternatives would have overall minor, site-specific, long-term, positive impacts on soils due to decreased soil contamination.

While alternative A for guided day hiking would continue minor long-term, localized, adverse impacts on soils from soil compaction and erosion, alternative B would have negligible long-term, localized, adverse impacts.

Alternative A for firewood sales would have no impact on soils. If new facilities are constructed for firewood sales under alternative B, impacts from disturbance to soils would be negligible long-term, site-specific, and adverse.

Alternative A for public showers would have no impact on soils. Alternative B would have negligible long-term, site-specific, adverse impacts on soils from ground disturbance.

Continuing to provide current boat tours and transportation (boat taxi) under alternative A would continue the negligible to minor long-term, adverse impacts specific to Lakes McDonald and Josephine, and St. Mary, Two Medicine, Swiftcurrent, and Waterton Lakes. These impacts would increase under alternative B due to added tour boat services, resulting in minor long-term, site-specific, adverse impacts.

Alternatives A and B for Horseback Riding and Horse Packing Services would result in an approximately equal amount of adverse impacts on soils, except that impacts along Apgar area trails would be less under alternative B. Alternatives A and B would have minor long-term, localized, adverse impacts from compaction and erosion due to horse use on trails. Soil contamination would

result in minor long-term, site-specific, adverse impacts. Impacts for alternative C would be the same as for alternative A, with the addition of localized impacts from erosion and compaction in the Two Medicine and St. Mary areas. Alternative C would affect a greater overall area of soils along trails than would alternative A, B or D. Alternative D would have the same impacts as alternative A. In addition, the removal of the Lake McDonald stables would have minor long-term, site-specific, positive impacts, while potential new development in the Apgar stables area would result in minor long-term, site-specific, adverse impacts. Permanent placement of new structures in alternative D would adversely impact a greater amount of soils than would the other alternatives.

There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Apgar Village Developed Area

- **Alternative A – Status Quo/No Action.** Improvements and repairs would have negligible short-term, adverse impacts during implementation.

Stabilizing the Lake McDonald shoreline and addressing basic erosion issues along the lakefront would reduce shoreline soil erosion, resulting in minor positive impacts. Stabilization activities would cause some short-term adverse impacts from sedimentation into Lake McDonald.

- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative. In addition, alternative B would develop approximately 2.5 acres of soil and restore over 0.5 acre of previously disturbed soil. All impacts would occur within the existing developed area.

Creating a pedestrian green space in Area I along Lake McDonald would restore approximately 0.5 acre of soil, resulting in a minor positive impact on soils.

Permanent placement of parking lots in Areas I and II would disturb soil and cause long-term loss of productivity of approximately 2.5 total acres of soil, resulting in minor adverse impacts. New parking would be designed to move parking away from the Apgar Loop roadside rather than increase the total amount of parking in the village. The area along Apgar Loop Road currently used for parking would be restored, resulting in a positive impact on soils along the roadside. The total amount of nonpoint source pollution from vehicles would not increase significantly, and there would be no increase in soil contamination. Nonpoint source pollution controls would be implemented.

Constructing trails and walkways throughout the village would disturb ground and compact soil, resulting in negligible adverse impacts. However, the development of main trails would discourage the use of multiple social trails, thereby reducing overall erosion and compaction of soils throughout the Apgar Village area and resulting in a positive impact.

Extending the operating season of the Village Inn eight weeks (three weeks earlier and five weeks later) could affect soil resources by concentrating more people along the shoreline and riparian areas when soils are saturated early in the year. This concentration could result in compaction,

unwanted “social trails” and if vegetation were lost, soil erosion. The effects would be negative, minor and long-term.

- **Alternative C.** Alternative C would develop a total of approximately 5.5 acres of soil and restore approximately 1.75 acres of soils. All disturbances would occur within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Removing the Village Inn and associated parking from Area I and rehabilitating the site for public space would restore approximately 0.75 acre of soils, resulting in minor positive impacts. Constructing new lodging units and parking in Area II to replace rooms lost from the Village Inn would cause disturbance. It would also cause the long-term loss of soil productivity of approximately 2.5 acres of soil within the existing developed area, resulting in minor adverse impacts.

Permanent additional boat ramp parking in Area I would disturb soil and cause long-term loss of productivity of approximately 0.5 total acre, resulting in minor adverse impacts.

Removing the environmental education cabin from Area II would restore less than 0.5 acre of soils, resulting in a positive impact. Extending a bicycle path adjacent to Area II to the campground would result in some adverse impacts on soils in the immediate area due to paving and soil compaction. Impacts would be negligible if the path follows the existing utility corridor and social trail.

Permanent additional boat ramp parking in Area I would disturb soil and cause long-term loss of productivity of approximately 0.5 total acre, resulting in minor adverse impacts.

- **Conclusion.** Although improvements and repairs would have negligible short-term, site-specific, adverse impacts, alternative A would have an overall minor long-term, site-specific, positive impact.

Overall, alternative B would restore soils and stabilize the shoreline, creating a minor long-term, site-specific, positive impact. Development of soils would result in negligible long-term, site-specific, adverse impacts. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

Alternative C would have the greatest overall impact on soils. It would cause substantially more ground disturbance and soil restoration than alternative A or B. Although alternative C would restore a greater overall amount of soils than would alternative A or B, overall positive impacts under this alternative would also be minor, long-term and site-specific. Overall adverse impacts under alternative C would be minor, long-term and site-specific.

Shoreline stabilization and soil restoration within the Wild and Scenic River corridor and Apgar Village developed area would have significant positive impacts.

None of the alternatives would adversely affect rare or sensitive soils. There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the

General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Improvements and repairs would have negligible short-term, adverse impacts during implementation. Improvements to the exterior surfaces of some existing structures might involve the removal of lead-based paint, which could contaminate soils in the area surrounding the structures. Proper mitigation measures would ensure that adverse impacts would be negligible and short-term.

Some ground disturbance, soil compaction and the permanent placement of walkways from constructing new accessible trails and walkways throughout the area would have negligible adverse impacts on soils because the trails and walkways would take advantage of current social trails. The development of main trails would also have a positive impact by discouraging the use of multiple social trails, thereby reducing overall erosion and compaction of soils throughout the Lake McDonald developed area.

- **Alternative B.** Impacts described under alternative A also apply to this alternative. In addition, alternative B would develop approximately 3 acres of soil and restore approximately 0.5 acre of previously disturbed soil. All impacts would occur within the existing developed area.

Constructing new guest and employee parking in Areas I and II would disturb soil and cause long-term loss of productivity of approximately 2 acres because placement of the new parking lots would take advantage of previously disturbed areas; this action would result in negligible adverse impacts. New parking would result in increased nonpoint source pollution from vehicles. However, with the implementation of nonpoint source pollution controls, adverse impacts from soil contamination would be negligible.

Constructing a new housing village for employees in Area II would develop approximately 1 acre of soil, resulting in minor adverse impacts from soil disturbance and long-term loss of soil productivity. Constructing a new public comfort station in Area II would create minimal ground disturbance and negligible adverse impacts.

Removing the Boys' Dormitories 1 and 2 from Area I, the Johnson, Jammer and Hydro Dormitories, and constructing a parking lot, laundry and maintenance facility on part of this site, would restore only a relatively small area of soils. Therefore, positive impacts from removing dormitories in Area I would be negligible. Removing the existing Coffee Shop parking lot and Girls' Dormitories 1 and 2 from Area II and replacing them with open green spaces would restore less than 0.5 acre of soil, resulting in minor positive impacts. Removing the driveway and parking by the cabins in Area II, and dedicating the area to pedestrian use would restore soil in the area. This action would result in less compaction from vehicles, causing minor positive impacts.

Extending the operating season of the Lake McDonald Lodge, General Store, Coffee Shop and other visitor accommodations five weeks (two weeks earlier and three weeks longer) would encourage visitor use along the shoreline and riparian areas when soils are saturated early in the year. The result could be soil compaction, unwanted "social trails" and if vegetation were lost, soil erosion. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Alternative C would develop a total of approximately 3 acres of soil and restore approximately 0.5 acre of previously disturbed soil. All disturbance would occur within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Removing the Coffee Shop and constructing a new restaurant with employee dining and post office in Area II would have negligible adverse impacts because the new restaurant would be constructed on previously disturbed soil. Constructing a new access road and parking adjacent to the guest cabin units in Area II would result in negligible adverse impacts because there is currently an access road and informal parking in the area of the cabin units, and minimal new soil disturbance would occur. There is a potential for better erosion control under this alternative that would reduce sediment transport.

- **Conclusion.** Overall, alternative A would have a negligible short-term, site-specific, adverse impact on soils due to minimal disturbance from improvements and repairs.

Alternative B would have an overall minor, long-term, site-specific, positive impact from restoration, and an overall minor, long-term, site-specific, adverse impact from development of soils. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

Alternative C would cause the greatest overall amount of new disturbance to soils, but just slightly more soil disturbance than alternative B. Development under alternative C would have an overall minor, long-term, site specific, adverse impact. Alternative C would restore approximately the same amount of soil as would alternative B, resulting in an overall minor, long-term, site specific, positive impact.

None of the alternatives would adversely affect rare or sensitive soils. There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Soils have been previously disturbed throughout the Rising Sun developed area, and current conditions would be maintained under this alternative. Improvements and repairs would have negligible short-term, adverse impacts during implementation. Improvements to the exterior surfaces of some existing structures might involve the removal of lead-based paint, which could contaminate soils in the area surrounding the structures. However, proper mitigation measures would ensure that adverse impacts would be negligible and short-term.

Some ground disturbance, soil compaction and permanent placement of walkways from constructing new accessible trails and walkways throughout the area would have negligible adverse impacts on soils because the trails and walkways would take advantage of current social trails. However, the development of main trails would discourage the use of multiple social trails,

reducing the overall erosion and compaction of soils throughout the area and resulting in a positive impact.

- **Alternative B.** Alternative B would develop a total of less than 2 acres of soil. All impacts would occur within the existing developed area, and impacts described under alternative A also apply to this alternative.

Constructing five new cabins with parking, a new employee dormitory with parking and an outdoor recreation facility, and a second boat concessioner employee cabin in Area I would result in disturbance and long-term loss of soil productivity of less than 2 acres of soil. Since Area I has been previously developed, this new construction would have negligible adverse impacts.

Extending the operating season of the visitor overnight accommodations, Coffee Shop and General Store/Motel/Dormitory five weeks (three weeks earlier and two weeks longer) would encourage earlier visitor use in areas where soils might still be saturated and susceptible to compaction, and if vegetation were lost, to erosion. The effects would be negative, minor and long term.

- **Alternative C (Preferred).** Alternative C would develop a total of over 2 acres of soil, and all disturbance would occur within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Constructing ten new cabins and associated parking, and two new employee dormitories including an outdoor recreation facility, in Area I would develop less than 4 acres of soil. Since Area I has been previously developed, this new construction would have negligible adverse impacts from soil disturbance. Modifying the intersection to the campground would have negligible adverse impacts because minimal soil disturbance would be involved and all disturbance would be immediately adjacent to the existing road.

- **Conclusion.** Overall, alternative A would have a negligible short-term, site-specific, adverse impact due to minimal disturbance from improvements and repairs.

Alternative B would have both positive and negative impacts. It would have an overall negligible, long-term, site-specific, adverse impact from development and an overall minor, long-term, site-specific, positive impact from reduced erosion potential. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

Alternative C would have the greatest overall impact on soils. Although alternative C would disturb slightly more soil than alternative B, overall negative impacts from development under this alternative would also be minor, long-term, and site-specific. There would be more action to reduce erosion under alternative C than under alternative B; however, beneficial impacts under this alternative would also be minor, long-term and site-specific.

None of the alternatives would adversely affect rare or sensitive soils. There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Two Medicine Developed Area



- **Alternative A – Status Quo/No Action.** Soils have been previously disturbed throughout the Two Medicine developed area, and current conditions would be maintained under this alternative. Improvements and repairs would have negligible short-term, adverse impacts during implementation.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative. In addition, alternative B would develop less than 2 acres of soil and restore as much as 0.5 acre of previously disturbed soil. All impacts would occur within the existing developed area.

Some ground disturbance, soil compaction and permanent placement of walkways from constructing new accessible trails and walkways throughout the area, including a pedestrian bridge over Appistoki Creek, would have negligible adverse impacts on soils because the trails and walkways would take advantage of current social trails. The development of main trails would also have a positive impact on soils by discouraging the use of multiple social trails, thereby reducing overall erosion and compaction of soils throughout the area.

The comfort station would be removed and a new one constructed at a new location in Area I, restoring soils at the former site and developing less than 0.5 acre at the new comfort station location. This minimal ground disturbance would have negligible adverse impacts. Restoring historic landscape features in front of the General Store, including the former comfort station site, would restore approximately 1 acre of soil, resulting in minor positive impacts.

Extending the operating season for the General Store four weeks (one week earlier and three weeks later) would encourage visitor use earlier in the season when soils would be saturated and susceptible to damage. The effects would be negative, negligible and long-term.

- **Conclusion.** Overall, alternative A would have negligible short-term, site-specific, adverse impacts from repairs and improvements.

Alternative B would have an overall positive impact. Although this alternative would result in negligible long-term, site-specific, adverse impacts from ground disturbance and extending the operating season, soil restoration would have overall minor long-term, positive, and site-specific impacts.

None of the alternatives would adversely affect rare or sensitive soils. There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Soils have been previously disturbed throughout the Many Glacier developed area, and current conditions would be maintained under this alternative. Improvements and repairs would have negligible short-term, adverse impacts during implementation.

Some ground disturbance, soil compaction and permanent placement of walkways from constructing new accessible trails and walkways throughout the area would have negligible adverse impacts on soils because the trails and walkways would take advantage of current social trails. The development of main trails would also have a positive impact on soils by discouraging the use of multiple social trails, thereby reducing overall erosion and compaction of soils throughout the area.

- **Alternative B.** This alternative would develop approximately 1 acre of soil. Less than 0.5 acre of soil would be restored. All impacts would occur within already developed areas, and impacts described under alternative A also apply to this alternative.

Rehabilitating the approach road, including screening and parking modifications in Area I would disturb a minimal amount of soil, most of which has been previously disturbed. Adverse impacts to soils would be negligible. Limiting access on the service road and landscaping the surrounding area would improve soil conditions along the lakeshore, resulting in minor positive impacts. Improving pedestrian access to and around the hotel would reduce the use of multiple social trails in the area, thereby reducing overall erosion and compaction of soils, and resulting in minor positive impacts.

Developing an accessible trail around Swiftcurrent Lake would result in the permanent placement of a hardened surface along the trail. Because the trail is currently heavily traversed, new impacts would be negligible.

Constructing an information/orientation pull-off on Many Glacier Road could potentially cause new soil disturbance. Depending on the location and amount of disturbance, adverse impacts could range from negligible to moderate.

For impacts on soils from constructing additional employee accommodations in the Swiftcurrent developed area, see the Swiftcurrent Developed Area below.

Extending the operating dates of the Many Glacier Hotel and other accommodations two weeks (one week earlier and one week later) would encourage visitor use earlier in the season when soils might still be saturated, and susceptible to compaction and if vegetation were lost, to erosion. The effects would be negligible, negative and long term.

- **Alternative C (Preferred).** This alternative would develop approximately 2 acres of soil. Less than 0.5 acre of soil would be restored, and all disturbance would occur within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Constructing a new dormitory and outdoor recreational facility in Area II would develop approximately 1 acre of soil. Some of the area has been previously disturbed and has been used for prior recreational purposes. Adverse impacts would be minor.

- **Conclusion.** Overall, alternative A would have a negligible short-term, site-specific, adverse impact on soils due to minimal disturbance from improvements and repairs.

Alternative B would have both positive and negative impacts on soils. Some soil conditions would be improved from reducing the use of social trails throughout the Many Glacier developed area and restoring some areas with landscape. However, overall, alternative B would have a negligible to minor long-term, site specific, adverse impact depending on how much soil would be disturbed from the construction of a new pull-off along Many Glacier Road.

Alternative C would have the greatest overall adverse impact on soils since more soils would be developed under this alternative than under alternative A or B. Overall adverse impacts would be minor, long-term and site specific. Alternative C would restore the same amount of soils as alternative B. Extending the operating season for both alternatives B and C would have negligible negative, long-term impacts.

None of the alternatives would adversely affect rare or sensitive soils. There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Soils have been previously disturbed throughout the Swiftcurrent developed area, and current conditions would be maintained under this alternative. Improvements and repairs would have negligible short-term, adverse impacts during implementation.
- **Alternative B (Preferred).** Alternative B would affect approximately 4 acres of soil and restore 0.5 acre of previously disturbed soil. All impacts would occur within the existing developed area. Impacts described under alternative A also apply to this alternative.

Reconfiguring the trail network throughout Areas I, II and III to separate vehicle and pedestrian circulation would cause minimal disturbance of new soil and negligible adverse impacts. The development of main trails would discourage the use of multiple social trails, and reduce overall erosion and compaction of soils throughout the area, having a positive impact on soils.

Constructing a fourth motel in Area I would disturb soil and cause long-term loss of productivity of approximately 0.5 acre of soil, resulting in negligible adverse impacts. Constructing three new cabin rings on the former Bath House and Motel 4 site in Area II, and approximately five new cabins to complete the existing cabin rings in Area II disturb soil and cause the long-term loss in soil productivity of approximately 0.5 acre. However, since construction would occur in areas that have been previously developed, adverse impacts would be negligible.

Moving parking from the inside cabin rings to the loop road in Area II would result in both positive and negative impacts. The permanent placement of new parking lots would disturb soil and cause long-term loss of productivity of less than 1 acre of soil, resulting in negligible adverse impacts. There would be a net increase in parking in the Swiftcurrent developed area that would

cause increased nonpoint source pollution from vehicles. However, with the implementation of nonpoint source pollution controls, adverse impacts from soil contamination would be negligible. Also, the areas within the cabin rings where parking currently exists would be restored, resulting in minor positive impacts.

Realigning the west access road in Area III would disturb soil and cause long-term loss of productivity of less than 0.5 acre of soil, resulting in negligible adverse impacts. Constructing additional visitor parking and formalizing employee parking adjacent to the Restaurant/Store in Area III would develop approximately 1 acre of soil, but would use previously developed areas, including the area occupied by the existing access road. Adverse impacts from this action would be negligible. Creating a new trailhead at the main parking area and a trail to the existing trailhead would disturb a minimal amount of soil, and cause increased soil compaction and erosion along the new section of trail. However, adverse impacts would be negligible because of the relatively small area affected.

Extending the operating dates of the visitor accommodations and Restaurant/Store three weeks (two weeks earlier and one week later) would encourage visitor use in areas when soils might still be saturated and susceptible to compaction, and if vegetation is lost, to erosion. The effects would be negative, minor and long term.

- **Alternative C.** Alternative C would develop approximately 5 acres of soil and restore less than 0.5 acre of soil. All disturbance would occur within the existing developed area. Applicable impacts described for alternatives A and B remain the same under this alternative with the following exceptions.

This alternative would construct new employee dormitories, showers, and indoor and outdoor recreation facilities; expand employee parking; construct a new cabin ring for employee housing; and fill in the existing employee cabin ring with one cabin. These actions would develop between 1 and 2 acres of soil in Area II. Since placement of the new employee complex would take advantage of previously developed areas, including the former Bath House site, there would be negligible adverse impacts.

- **Conclusion.** Alternative A would have a negligible short-term, site-specific, adverse impact on soils due to minimal disturbance from improvements and repairs. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

Alternative C would result in somewhat more soil disturbance than alternative B, and both alternatives would restore approximately the same amount of soil. Both alternatives would have an overall minor, long-term, site-specific, adverse impact on soils.

None of the alternatives would adversely affect rare or sensitive soils. None of the alternatives would adversely affect rare or sensitive soils. There would be no significant adverse impacts on soils whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of soils as a result of the implementation of any of the alternatives.

Cumulative Impacts

In areas throughout and adjacent to the park, past actions such as development have led to disturbance of park soils, as do ongoing services. This disturbance is within developed areas, along roads and trails, and near lakes and rivers. Reasonably foreseeable projects outside the park such as constructing additional employee housing, improving roads and bridges, U.S. Forest Service timber salvaging and reforestation are small in scope compared to the total area of the region. Impacts on soils from these projects would be either site-specific or localized. The combined impact of all actions both inside and outside the park and any of the alternatives would have a minor long-term, regional, adverse cumulative effect on soils.

VEGETATION

Methodology

Current vegetation conditions were assessed through consultation with the park's staff ecologist and biological technicians, synthesis of research reports and databases, and field surveys conducted during the summer of 2001.

Thresholds of impact are defined in Table 4.1.

- *Negligible*: No native vegetation would be affected or some individual native plants could be affected, but there would be no effect on native species populations. The effects would be on a small scale, and no species of concern would be affected.
- *Minor*: Native plants would be affected over a relatively small area and a minor portion of a species' population.
- *Moderate*: Native plants would be affected over a relatively wide area (greater than 5 acres) or at multiple locations, and would be readily noticeable.
- *Major*: There would be a widespread effect on native species' populations or a considerable effect on native plant populations, including species of concern, over a very large area (greater than 10 acres).
- *Short-term*: After implementation, would recover in less than 3 years.
- *Long-term*: After implementation, would take more than 3 years to recover or effects would be permanent.



Impacts Common to All Alternatives

All construction work would have negligible to minor short-term, site-specific, adverse impacts on vegetation from temporary disturbance and vegetation trampling. Installation of new structures would have minor to moderate long-term, adverse impacts. Besides the extent of vegetation removal, a primary factor in analyzing impacts is the seasonal timing of construction work. Vegetation is most sensitive to trampling and destruction during spring and early summer (March through June) when soils are wettest and plant root

structures are more easily damaged. The next most sensitive time period is the fall season (mid-September through mid-November), when soils are wetter than during summer and plants are, or soon will be inactive. Ground that is disturbed in the fall is subjected to freeze-thaw conditions and springtime erosion caused by thawing before plants have an opportunity to recover through new growth. Ground disturbance during summer (mid-June through mid-September) would occur when soils are relatively dry and vegetation has some growing time to recover.

Greater levels of vegetation disturbance require longer recovery times and cause increased levels of soil erosion and compaction, and increased potential for invasion by exotic plants, including noxious weeds. While vegetation may recover in a short amount of time, the resulting expansion of exotic plant species may be a long-term consequence. The spread of exotic species, including noxious weeds into disturbed areas under any of the alternatives would have a minor to moderate long-term, adverse impact on vegetation, depending on the area of disturbance and the potential area of spread. The revegetation of disturbed areas with native vegetation and implementation of a noxious weed management program would mitigate the spread of noxious weeds. Maintaining or expanding development in any area also alters fire regimes of nearby vegetation communities, as fires are generally extinguished to protect park structures.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action.** In alternative A, periodic ground disturbance for system maintenance and possible soil contamination would continue to have minor adverse impacts on vegetation. Alternative A would continue to have minor adverse impacts from trampling and vegetation loss from visitors accessing the drinking water source.
- **Alternative B (Preferred).** Water system improvements and toilet construction would disturb approximately 4,250 square feet of ground. Disturbance would occur in herbaceous and shrub cover vegetation types near tree line, dominated by subalpine fir, swamp-gooseberry, slender wheatgrass, mountain hairgrass and smooth woodrush. This grass/forb subalpine meadow vegetation type is fairly common, and typically recovers very slowly from disturbance. Exotic species present in currently disturbed sites around the chalet include timothy, dandelion and Kentucky bluegrass. Some subalpine meadows are very slow to recover from ground disturbance, and may never fully rebound to original plant composition due to soil erosion and compaction, and due to exotic species invasion (Hartley 1999). Ground disturbance would cause minor short-term, adverse impacts on vegetation resources, while vegetation removal would cause minor long-term, adverse impacts. Improving the water and sewage system would also have a minor positive impact on vegetation resources by reducing the frequency of soil contamination and ground disturbance.
- **Alternative C.** This alternative would have the same impacts as alternative B; however, the construction of a new gray water system would result in slightly more ground disturbance and vegetation removal. System placement would result in 1,500 additional square feet of disturbance.

Guided Day Hiking (Cultural/Natural/Recreational)

- **Alternative A – Status Quo/No Action.** Although trained guides offer some enhancement to visitor awareness of sensitive resources and leave-no-trace backcountry travel techniques, the lack of limits to group size or number of trips per day under alternative A could cause increased trailside vegetation trampling and erosion when large groups are assembled. Participants could

crowd trails and erode them into wider trail cuts. This alternative would cause negligible adverse impacts on vegetation resources.

- **Alternative B (Preferred).** This alternative would limit group size for guided day hikes and the number of trips per day on high-traffic trails, thereby reducing the potential for vegetation trampling and soil erosion. Alternative B would also have a negligible adverse impact on vegetation.

Guided Underwater Diving Tours

- **Alternative A – Status Quo/No Action.** This alternative would have no impact on vegetation because guided underwater diving tours would not be available in the park.
- **Alternative B (Preferred).** This alternative would cause negligible adverse impacts on vegetation along informal lakeshore social trails. Although trained guides would direct visitors to appropriate locations, vegetation trampling and soil erosion could occur at staging areas and along social trails associated with guided diving from lakeshores.

Firewood Sales

- **Alternative A – Status Quo/No Action.** Continuing to sell firewood in camp stores would continue to reduce the extent of wood gathering around campgrounds, thereby reducing trampling along social trails surrounding campgrounds. This operation would have a minor beneficial impact on vegetation.
- **Alternative B (Preferred).** Although expanding firewood sales operations at developed campgrounds might entail new ground disturbance, it would also reduce the impacts associated with visitors gathering wood from around the campgrounds. Overall, this reduction in vegetation trampling along social trails surrounding campgrounds would cause minor long-term, beneficial impacts on vegetation resources.

Public Showers

- **Alternative A – Status Quo/No Action.** This alternative would have no impact on vegetation.
- **Alternative B (Preferred).** Impacts from alternative B associated with the construction of new shower facilities would be minor. Relatively small areas would likely be adversely affected.

Guided Interpretive Motor Vehicle Tours and Public Transportation

- **Alternative A – Status Quo/No Action.** The increasing number of vehicles traveling park roads has caused the proliferation of informal roadside social trails and undesignated parking along road shoulders in congested areas. Vegetation trampling and soil erosion along these social trails and at undesignated parking areas has adversely impacted vegetation. It is not known whether the availability of commercial vehicle tours decreases or adds to the number of private vehicles on park roads. Generally, the shuttle and taxi services cause a negligible reduction in the number of private vehicles on park roads. If commercial vehicle tour services decreases the number of private vehicles, then this alternative would continue to cause minor positive impacts by slightly reducing vegetation trampling and soil erosion along roadside social trails. Mitigation measures under this alternative would include requiring tour buses to stop only at designated areas and commercial vehicle tour concessioners to educate visitors about the impacts of social trails on vegetation.

- **Alternative B (Preferred).** Because taxi and private vehicle shuttle services are usually used primarily by visitors without personal vehicles and visitors completing loop hikes, the expansion of these services under alternative B would have a negligible influence on the number of vehicles on park roads. Assuming that the expansion of commercial vehicle tours would decrease the number of private vehicles on park roads, a slight reduction in trampling and erosion along undesignated, roadside social trails and at undesignated overflow parking sites, as well as the education of visitors by tour providers regarding protection of natural resources would result in positive impacts under alternative B.

Horseback Riding and Horse Packing Services

- **Alternative A – Status Quo/No Action (Preferred).** Continuing current horseback riding and horse packing services under alternative A would continue to cause moderate adverse impacts on vegetation due to vegetation trampling and soil erosion. Trampling and destruction of vegetation occurs along designated trails open to horse traffic, especially during the spring and fall periods, when soils are at their wettest and vegetation is most susceptible to damage. Where horse impacts are greatest along high-use trails and at stables and corrals, this disturbance promotes the establishment and spread of noxious weeds. Cutting new trails by hikers and horses in order to avoid deep ruts in high-use trails also causes impacts.
- **Alternative B.** Impacts described for alternative A are the same for alternative B, except that the elimination of commercial horseback riding day trips from the Apgar stables under alternative B would reduce impacts to vegetation along Apgar area trails. Within the Apgar area, the reduction of vegetation trampling, soil erosion and spread of noxious weeds along Apgar area trails would cause minor positive impacts.
- **Alternative C.** Adding horseback riding in the Two Medicine and St. Mary areas would result in the same adverse impacts as alternative A with an increase in vegetation trampling, erosion and spread of noxious weeds along trails. New impacts on vegetation would be minor since additional horseback riding trips would occur only during July, August and September when soils are relatively dry.
- **Alternative D.** Impacts described for alternative A also apply to alternative D, except that the removal of the Lake McDonald Lodge stables and corral would reduce site-specific impacts on vegetation resources. Since there would be trailhead parking and a stock-loading ramp in the area and guided horseback riding day trips would continue on area trails, the removal of the stables and corral would result only in negligible to minor site-specific, positive impacts on vegetation. Although detailed site plans will undergo future analysis, the expansion of facilities at the Apgar stables would likely cause minor adverse impacts due to vegetation removal, increased vegetation trampling, and the increased threat of spreading noxious weeds.

Conclusion

At Granite Park Chalet, possible soil contamination and periodic ground disturbance for system maintenance in alternative A would continue to have minor long-term, site-specific, adverse impacts. Alternatives B and C would have both positive and negative impacts. Generally, although alternative B would result in more ground disturbance than alternative C, both alternatives would have minor long-term, site-specific, adverse impacts from ground disturbance. Improvements to the water and sewage system under both alternatives would cause minor long-term, site-specific, positive impacts.

Although under alternative B, guided day hiking would have a less negative impact on vegetation than alternative A because it limits group sizes and the number of trips per day on high-traffic trails, impacts from trailside vegetation trampling and increased erosion would be negligible long-term, localized, and adverse for both alternatives.

Guided underwater diving tours under alternative A would not be available in the park; therefore there would be no impact on vegetation. In alternative B, vegetation trampling and erosion along informal lakeshore social trails and at staging areas would cause negligible long-term, site-specific, adverse impacts.

Alternatives A and B for firewood sales would reduce trampling from visitors gathering wood, resulting in overall minor long-term, site-specific, positive impacts near campgrounds.

Alternative A for public showers would have no impact on vegetation. In alternative B, vegetation removal associated with the construction of new facilities would have overall minor long-term, site-specific, adverse impacts.

Assuming that guided interpretive motor vehicle tours and public transportation services reduce the number of private vehicles on park roads, alternative A would reduce the amount of vegetation trampling and erosion along roadsides and at undesignated parking areas, continuing to have minor long-term, widespread, positive impacts. Alternative B would not dramatically decrease the number of private vehicles on park roads and would have the same impacts as alternative A.

Alternatives A and B for horseback riding and packing services would result in vegetation trampling and erosion due to horse use on trails, having moderate long-term, localized, adverse impacts; however, impacts along Apgar area trails would be less significant under alternative B. Impacts for alternative C would be the same as for alternative A, with the addition of localized impacts from vegetation trampling and erosion in the Two Medicine and St. Mary areas. Alternative D would have the same impacts as alternative A. The removal of the Lake McDonald stables and the use of the area as a trailhead in alternative D would have negligible to minor long-term, site-specific, positive impacts, while potential new development in the Apgar stables area would result in minor long-term, site-specific, adverse impacts. Because alternative D reduces horse-related facilities, there are fewer impacts than in alternatives A and C, but greater impacts than alternative B.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Apgar Village Developed Area

- **Alternative A – Status Quo/No Action.** Minimal ground disturbance would occur under this alternative. Most of the disturbance would affect herbaceous and shrub cover types adjacent to Lake McDonald's cobble beach. Vegetation impacted in these riparian areas would include cottonwood, birch, redcedar and spruce trees with an understory dominated by willows, alder and sedges. Exotics already present in the area include knapweed, oxeye daisy and common tansy. This riparian cover is not especially common because it is restricted to lakeshore and streamside

sites. Improvements and repairs that disturb ground or cause trampled vegetation would have negligible to minor short-term, adverse impacts on vegetation resources.

Constructing new accessible trails and walkways, including the hardening or paving of some pathway surfaces, would remove and/or trample some vegetation, resulting in minor adverse impacts. All trails and pathways would cause long-term impacts on vegetation resources while they are maintained; unpaved trails, however, would be easier to reclaim if abandoned. The development of main trails, however, would also have a positive impact on vegetation by discouraging the use of multiple social trails, thereby reducing overall vegetation trampling and erosion throughout the Apgar Village area.

The shoreline stabilization actions would create ground disturbance as well as the potential for spread of exotic plant species, including noxious weeds, and would have negligible adverse impacts.

- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative. In addition, alternative B would disturb and remove vegetation over approximately 2.5 acres and restore more than 0.5 acre of vegetation. All impacts would occur within the existing developed area.

Creating a pedestrian green space in Area I along Lake McDonald would restore 0.5 acre of vegetation, resulting in a minor positive impact on vegetation. Revegetating the area with native vegetation would help mitigate vegetation damage and the potential spread of exotic plants, including noxious weeds.

The construction of new parking lots in Areas I and II would result in approximately 2.5 acres of ground disturbance and vegetation removal. Vegetation removed would include trees, woody shrubs and herbaceous ground cover. The majority of new disturbance would be in forest that is currently under successional larch-lodgepole pine cover type, and whose climax cover type is western redcedar-western hemlock. As described in Chapter 3, this cover type has spruce, redcedar, hemlock, white pine, and Douglas fir regenerating in the understory, with mature cottonwood and birch in forest openings. Common understory species include twinflower, prince's pine, queencup beadlily, spiraea, bunchberry dogwood, and thimbleberry. This cover type is common in the Apgar Village area. Some disturbance to stands dominated by large-diameter black cottonwood trees might take place in Area II. In addition, mature trees located near new parking lots would be removed if identified as safety hazards under the park's Hazard Tree Management Plan. Adverse impacts on vegetation from constructing new parking lots would be minor because of the relatively small area of disturbance. New parking would move parked vehicles away from the Apgar Loop roadside; the area along Apgar Loop Road currently used for parking would be reclaimed and planted with native vegetation, resulting in a positive impact on vegetation.

Extending the operating season of the Village Inn eight weeks (three weeks earlier and five weeks later) could effect vegetation by encouraging visitor use of the area earlier in the season when soils are saturated and vegetation is just emerging and vulnerable to trampling. The result could be damage or loss of vegetation, change in species composition and the possible spread of exotic plants. The effects would be negative, minor and long-term.

- **Alternative C.** Alternative C would result in a total of approximately 5.5 acres of ground disturbance and vegetation removal, and 1.75 acres of restoration. All disturbances would occur

within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative, with the following exceptions.

Removing the Village Inn and associated parking from Area I and rehabilitating the site to be used as public space would restore over 0.75 acre of ground. The rehabilitation of the area for public use would offset positive impacts from restoration because of vegetation trampling and soil erosion, and because exotic species would likely be used in landscaping. Overall, positive impacts on vegetation would be minor. Constructing new lodging units and parking in Area II to replace the Village Inn would result in approximately 2.5 acres of ground disturbance and vegetation removal. The majority of new disturbance would occur in forest that is currently under successional larch-lodgepole pine cover type and whose climax cover type is western redcedar-western hemlock. This action would have minor adverse impacts on vegetation.

Permanent additional boat ramp parking in Area I would disturb vegetation and cause long-term loss of approximately 0.5 total acre, resulting in minor adverse impacts.

Removing the environmental education cabin from Area II would restore less than 0.5 acre of ground, resulting in a negligible but positive impact. Extending a bicycle path adjacent to Area II to the campground would result in some adverse impacts on vegetation in the immediate area, due to the removal and trampling of vegetation. Impacts would be negligible if the path follows the existing utility corridor and social trail.

- **Conclusion.** Alternative A would have an overall negligible to minor long-term, site-specific, adverse impact on vegetation from ground disturbance.

Alternative B would disturb approximately 2.5 acres of vegetation and restore 0.5 acre, resulting in both positive and negative impacts. Ground disturbance and vegetation removal would result in minor long-term, site-specific, adverse impacts; restoration actions would result in minor long-term, site-specific, positive impacts.

Extending the operating season for both alternatives B and C would have minor negative, long-term impacts. Alternative C would have the greatest overall impact on vegetation. It would cause substantially more ground disturbance and vegetation removal than alternative A or B (approximately 5.5 acres). Adverse impacts under alternative C would be moderate, long-term and site-specific. Although alternative C would restore a greater overall amount of vegetation than would alternatives A or B (approximately 1.75 acres), overall positive impacts under this alternative would also be minor, long-term and site-specific.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Minimal ground disturbance would occur under this alternative. Improvements and repairs that disturb ground and cause trampled vegetation would have negligible to minor short-term, adverse impacts on vegetation resources.

Constructing new accessible trails and walkways, including hardening or paving of some pathway surfaces, would cause the removal and trampling of some vegetation, resulting in minor adverse impacts. All trails and pathways would cause long-term impacts on vegetation resources while they are maintained; unpaved trails, however, would be easier to reclaim if abandoned. The development of main trails, however, would also have a positive impact on vegetation by discouraging the use of multiple social trails, thereby reducing overall vegetation trampling and erosion throughout the Lake McDonald area.

- **Alternative B.** Impacts described under alternative A also apply to this alternative. In addition, alternative B would involve approximately 3 acres of ground disturbance and vegetation removal, and less than 0.5 acre of restoration. All impacts would occur within the existing developed area.

Constructing new guest and employee parking in Areas II and I would clear approximately 2 acres. The construction of a new parking lot in Area I would require the removal of some large trees from a mature forest stand containing large-diameter western redcedars, black cottonwoods and western larch. All understory vegetation, described in Chapter 3, would also be removed and over time, some old growth trees from the surrounding area would be removed if identified as safety hazards under the park's Hazard Tree Management Plan. This cover type is fairly common for the Lake McDonald area and impacts would be minor. The expansion of parking in Area II would require the removal of mature larch trees and young cedar and western hemlock trees, the removal of herbaceous and shrub vegetation, and the gradual removal of hazard trees. Because the placement of the new parking lots would take advantage of previously disturbed areas and result in a relatively small area of impact, adverse impacts on vegetation would be moderate.

Constructing a new employee housing village in Area II would clear approximately 1 acre of vegetation. A number of trees, including larch, cottonwood, paper birch, and young cedar and hemlock trees, along with understory vegetation would be removed. The area affected would be relatively small and the vegetation cover type in the area is common; therefore, adverse impacts would be minor. Constructing a new public comfort station in Area II would cause minimal ground disturbance and vegetation removal, resulting in minor adverse impacts.

Converting the Garden Court, Cobb House, and Snyder Hall Dormitories to guest accommodations and the Stewart Motel to employee housing would result in vegetation trampling during construction, causing negligible short-term, adverse impacts.

Removing Boys' Dormitories 1 and 2, as well as the Johnson, Jammer and Hydro Dormitories from Area I, and constructing a parking lot, laundry and maintenance facility on part of this site would have negligible positive impacts on vegetation. The construction of a laundry and maintenance facility could require the removal of very large diameter cottonwood and cedar trees. However, tree removal would be minimal, and adverse impacts would be negligible. Removing the existing Coffee Shop parking lot and Girls' Dormitories 1 and 2 from Area II and replacing them with open green spaces would restore less than 0.5 acre. If native vegetation is planted in these open green spaces, impacts would be minor and positive. The use of native vegetation for this revegetation work would be preferable to a lawn cover of exotic grasses.

Extending the operating season of the Lake McDonald Lodge, General Store, Coffee Shop and other visitor accommodations five weeks (two weeks earlier and three weeks longer) would effect vegetation by encouraging visitor use earlier in the season when soils are saturated and vegetation is just emerging and vulnerable to trampling. The result could be damage or loss of vegetation, change in species composition and the possible spread of exotic plants. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Alternative C would result in a total of approximately 3 acres of ground disturbance and less than 0.5 acre of restoration. All disturbances would occur within the existing developed area. Applicable impacts described for alternatives A and B would remain the same under this alternative with the following exceptions.

Removing the Coffee Shop and constructing a new restaurant with employee dining and post office in Area II would have negligible adverse impacts from minimal vegetation removal because the new restaurant would be constructed in a previously disturbed area. Constructing a new access road and parking adjacent to the guest cabin units in Area II would result in minimal vegetation removal because there is already an access road and informal parking in the area of the cabin units. Adverse impacts would be negligible.

- **Conclusion.** Alternative A would have an overall negligible to minor long-term, site-specific, adverse impact on vegetation from ground disturbance.

Alternative B would have both positive and negative impacts on vegetation, with greater negative impacts. This alternative would clear just less than 3 acres, which would have an overall minor long-term, site-specific, adverse impact. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

Alternative C would have slightly more negative impacts than alternative B. Clearing approximately 3 acres would result in an overall minor long-term, site-specific, adverse impact on vegetation. Alternative C would result in approximately the same amount of revegetated areas as alternative B.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Minimal ground disturbance would occur under this alternative. Improvements and repairs that disturb ground and cause trampled vegetation would have negligible to minor short-term, adverse impacts on vegetation resources.

Constructing new accessible trails and walkways, including hardening or paving of some pathway surfaces, would entail removal and/or trampling of some vegetation. Primarily grassland vegetation type would be impacted, including fescues, brome, bluebunch wheatgrass, junegrass, needle grass and sedges. The grassland vegetation type is fairly common to the area, but is

sensitive to disturbance, particularly to the spread of exotics. Exotics are already quite prevalent in the Rising Sun developed area, including knapweed, oxeye daisy, Canada thistle, houndstongue, and St. John's wort, and the threat of further spread is of concern. Impacts on vegetation would be minor and adverse. All trails and pathways would cause long-term impacts on vegetation resources while they are maintained; unpaved trails, however, would be easier to reclaim if abandoned. The development of main trails would also have a positive impact on vegetation by discouraging the use of multiple social trails, and thereby reducing overall vegetation trampling and erosion throughout the Rising Sun area.

- **Alternative B.** Impacts described under alternative A also apply to this alternative. In addition, alternative B would disturb less than 2 acres of ground. All impacts would occur within the existing developed area.

Stabilizing the bluff where historic guest cabins are located above Rose Creek would disturb and remove some riparian vegetation. Riparian areas support cottonwood, spruce and lodgepole pine trees, with willows, alder and diverse forbs in the understory. This vegetation is not very common in the area, and ground disturbance and vegetation trampling would have minor short-term, adverse impacts on vegetation.

Constructing five new guest cabins with parking and a second employee cabin for the boat concessioner in Area I would remove approximately 2 acres of vegetation, including mature Douglas fir trees, and increase vegetation trampling from visitor recreation activities. The Douglas fir community type is not especially common to the St. Mary Valley; however, in the Rising Sun area, these Douglas fir stands support a diverse understory of shrubs and forbs common to the adjacent grassland vegetation type. The area has been previously developed and adverse impacts on vegetation would be minor to negligible.

Constructing a new employee dormitory with parking and an outdoor recreation facility in Area I would remove less than 1 acre of vegetation with grassland, herbaceous and shrub species, and a few mature Douglas fir trees. Because the area is small and has been partially disturbed by previous development, adverse impacts on vegetation would be minor. The new employee facility would be situated adjacent to sensitive grassland habitat, which is susceptible to the spread of exotic plants, including noxious weeds that are currently present throughout the Rising Sun area. The potential for exotic plant species to spread into a wide area of grassland habitat could have moderate adverse impacts on this sensitive vegetation resource.

Removing the boat concessioner employee housing from Area III would also remove a source of disturbance from sensitive riparian vegetation, causing minor long-term, positive impacts. Moving the ticket booth out of the high water zone would remove vegetation, including aspen trees, alder shrubs, and understory vegetation; however, the amount of removal would be minimal, and adverse impacts would be negligible.

Extending the operating season of the visitor overnight accommodations, Coffee Shop and General Store/Motel/Dormitory five weeks (three weeks earlier and two weeks longer) would encourage visitor use earlier in the spring when soils might be saturated and emerging vegetation more vulnerable to trampling. Five more weeks of occupancy would increase overall effects to vegetation in the vicinity of the developed area. The result could be damage to or loss of vegetation, change in species composition and the possible spread of exotic plants. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Alternative C would disturb more than 2 acres. All disturbances would take place within the existing developed area. Impacts described for alternatives A and B, including extending the operating season, would remain the same under this alternative with the following exceptions.

Constructing ten new guest cabins and associated parking in Area I would result in more ground disturbance and vegetation removal (over 1 acre) than would constructing five new cabins under alternative B. However, because the area of disturbance is small and the area has been previously disturbed, minor adverse impacts on vegetation would occur. Vegetation removal would include mature Douglas fir trees as well as shrub and herbaceous understory growth.

Constructing two new employee dormitories and an outdoor recreation facility in Area I would result in more ground disturbance and vegetation removal (over 1 acre) than would constructing one new employee dormitory under alternative B; however, the area of disturbance would still be relatively small, and adverse impacts on vegetation would also be minor. Vegetation removal would involve herbaceous and shrub cover as well as some mature Douglas fir trees. The potential for the spread of exotic plant species into sensitive grassland habitat described under alternative B also applies to this alternative.

Converting the Main Dormitory to visitor accommodations, Power House Dormitory to storage, and the Lower Motel to employee housing would entail vegetation trampling associated with temporary staging and materials storage, causing negligible short-term, adverse impacts.

Modifying the intersection to the campground would cause minimal vegetation removal for new pavement, and would result in negligible adverse impacts on vegetation. Revegetation would have positive impacts and mitigate the spread of exotic species and noxious weeds.

- **Conclusion.** Alternative A would have an overall negligible to minor long-term, site-specific, adverse impact on vegetation from ground disturbance.

Although alternative B would have some positive impacts on vegetation, overall impacts would be minor long-term, site-specific and adverse from ground disturbance, vegetation removal, and the potential spread of exotic species into sensitive grassland habitat. Alternative B would disturb less than 2 acres of ground.

Extending the operating season for both alternatives B and C would have minor negative, long-term impacts. Alternative C would result in only slightly more ground disturbance and vegetation removal than would alternative B, and the total area of impact would be relatively small (approximately 2 acres). Overall impacts on vegetation from alternative C would also be minor, long-term, site-specific, and adverse.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative A – Status Quo/No Action.** Minimal ground disturbance would occur under this alternative. Improvements and repairs that disturb ground and cause trampled vegetation would have negligible to minor, adverse impacts on vegetation resources.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative. In addition, alternative B would disturb less than 2 acres of ground and restore as much as 0.5 acre. All impacts would occur within the existing developed area. Most of this disturbance would affect a riparian vegetation type along the Two Medicine Lake shore near the General Store and along Appistoki Creek. These riparian areas support cottonwood, alder, willow, and various forbs, sedges and grasses common to the adjacent grassland vegetation. Riparian areas are fairly common in the Two Medicine developed area, but are already impacted by heavy visitor use.

Constructing new accessible trails and walkways, hardening or paving some pathway surfaces, and constructing a pedestrian bridge over Appistoki Creek would have minor adverse impacts on vegetation due to the removal and trampling of some vegetation. All trails and pathways would cause long-term impacts on vegetation resources while they are maintained; unpaved trails, however, would be easier to reclaim if abandoned. The development of main trails would also discourage the use of multiple social trails, thereby reducing overall vegetation trampling and erosion throughout the Two Medicine developed area and creating a positive impact on vegetation.

Constructing a service road and service/bus parking area for the General Store would disturb less than 1 acre of ground in a site of gravelly soils and sparse black cottonwood trees, shrubs, and herbaceous plant cover adjacent to Appistoki Creek. This area is already somewhat disturbed due to creek channelization and informal service vehicle access. Adverse impacts from some vegetation removal would be negligible to minor. Screening around the service road and parking area with native vegetation would mitigate adverse impacts.

Constructing a new comfort station would disturb less than 0.5 acre of vegetation at the edge of a sensitive grassland community, which includes fescues, brome, bluebunch wheatgrass, junegrass, needle grass and sedges. Grassland vegetation type is not common in the Two Medicine developed area and is particularly sensitive to the spread of exotic plants. Exotic plants already prevalent in the Two Medicine developed area include knapweed, common tansy, Canada thistle, butter-and-eggs and yellow bedstraw. This disturbance would cause minor adverse impacts because of its small area. The increased potential for exotic plant species that are currently present in the Two Medicine area to spread into a relatively pristine and sensitive grassland community could have minor adverse impacts on vegetation.

It is unknown how vegetation would be impacted by restoring historic landscape features in front of the General Store, including the former comfort station site, because landscaping plans have not yet been specified. Impacts would be positive if native vegetation rather than exotic species lawn cover were used for revegetation.

Extending the operating season for the General Store four weeks (one week earlier and three weeks later) would encourage visitor use in areas when soils might still be saturated and emerging plants susceptible to trampling. The result could be damage or loss of vegetation, change in species composition and the possible spread of exotic plants. The effects would be negligible, negative and long-term.

- **Conclusion.** Overall, alternative A would have negligible to minor long-term, site-specific, adverse impacts on vegetation from repairs and improvements.

Alternative B would disturb less than 2 acres of ground, and would have minor long-term, site-specific, adverse impacts on vegetation. Minor long-term, site-specific, positive impacts could occur if restored areas are planted with native species. Extending the operating season would have negligible negative, long-term impacts.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Minimal ground disturbance would occur under this alternative. Improvements and repairs that disturb ground and cause trampled vegetation would have negligible to minor, short-term, adverse impacts on vegetation resources.

Constructing new accessible trails and walkways, including hardening or paving of some pathway surfaces, would have minor adverse impacts on vegetation due to the removal and trampling of some vegetation. All trails and pathways would cause long-term impacts on vegetation resources while they are maintained; unpaved trails, however, would be easier to reclaim if abandoned. The development of main trails would also discourage the use of multiple social trails, thereby reducing overall vegetation trampling and erosion throughout the Many Glacier developed area and resulting in a positive impact on vegetation.

Most disturbance would occur in an open, rocky grassland vegetation type with common grassland species, such as fescues, brome, bluebunch wheatgrass, junegrass, needle grass and sedges. Grassland vegetation type is fairly common in the Many Glacier developed area. Disturbance is likely to cause further spread of exotic plants. Exotics already present in Many Glacier developed area include knapweed, Canada thistle, houndstongue, and butter-and-eggs.

- **Alternative B.** Impacts described under alternative A also apply to this alternative. In addition, alternative B could disturb approximately 1 acre of ground and restore less than 0.5 acre. All impacts would occur within the existing developed area.

Assuming some native species would be used, planting vegetation for screening and landscaping along the approach road and in the area surrounding the hotel would result in minor to negligible, positive impacts on vegetation by restoring native vegetation in the area.

Improving pedestrian access to and around the hotel would reduce the use of multiple social trails, thereby reducing overall vegetation trampling and erosion around the hotel, and resulting in negligible to minor, positive impacts on vegetation. Developing an accessible trail around Swiftcurrent Lake would result in minimal vegetation removal. Because the accessible trail would primarily follow the existing trail, most impacts would be negligible. If new switch-backing is required across steeper sections, there would be new minor long-term impacts on vegetation, including vegetation removal in a mature forest stand of Engelmann spruce and subalpine fir.

The intensity, duration and context of adverse impacts associated with development of an orientation pullout along the Many Glacier Road would depend on final site plans. The area developed for a pullout would be relatively small, and depending on the location and amount of disturbance, adverse impacts on vegetation could range from negligible to minor.

Extending the operating dates of the Many Glacier Hotel and other accommodations two weeks (one week earlier and one week later) would result in encouraging visitor use in areas earlier in the season when soils might still be saturated and emerging plants susceptible to trampling. The result could be damage or loss of vegetation, change in species composition and the possible spread of exotics. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Alternative C would disturb approximately 2 acres and restore less than 0.5 acre of ground. All disturbances would occur within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Converting the Lower Dormitory in Area II to visitor accommodations would entail vegetation trampling associated with temporary staging and materials storage, resulting in negligible short-term, adverse impacts.

Constructing a new dormitory and outdoor recreational facility in Area II would disturb ground and remove vegetation in approximately 1 acre. Some of the area has been previously disturbed and used for prior recreational purposes. The area is adjacent to a wetland that supports wetland understory species, primarily alder, willow and sedges. Wetlands are not common in the Many Glacier developed area; however, the placement of the new employee facility would avoid the wetland area. The area of disturbance would also be relatively small, and adverse impacts on vegetation would be minor. Increased employee recreation in the area would also increase vegetation trampling, which would result in additional minor adverse impacts. This area encompasses a transitional site supporting lodgepole pine, subalpine fir, spruce forest, and grassland vegetation types. Disturbance is likely to result in the further spread of exotic plants.

- **Conclusion.** Alternative A would have an overall negligible to minor long-term, site-specific, adverse impact on vegetation from ground disturbance.

Alternative B would have both positive and negative impacts on vegetation from disturbing approximately 1 acre and restoring approximately 0.5 acre of ground. Planting some native vegetation and reducing trampling around the hotel would result in an overall minor long-term, site-specific, positive impact on vegetation. Ground disturbance and some vegetation removal throughout the Many Glacier developed area and at a pullout site along Many Glacier Road would have minor long-term, site-specific, adverse impacts on vegetation. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

Alternative C would have the same positive impact on vegetation as alternative B but would have additional adverse impacts. More ground disturbance and vegetation removal on approximately 2 acres would occur under alternative C than under alternatives A or B. However, the total area of disturbance would still be relatively small, and overall adverse impacts from alternative C would be minor, long-term, and site-specific.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Minimal ground disturbance would occur under this alternative. Improvements and repairs that disturb ground and cause trampled vegetation would have negligible to minor adverse impacts on vegetation resources.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative. In addition, alternative B would disturb approximately 4 acres and restore less than 0.5 acre of ground. A little less than half of this new disturbance would occur in forest stands supporting mature lodgepole pine trees plus shrub and herbaceous understories. As described in Chapter 3, these forest stands are dominated by lodgepole pine with some cottonwood, aspen, subalpine fir and spruce. Understory species include beargrass, snowberry, false huckleberry, serviceberry, buffaloberry, willow, honeysuckle, queencup beadlily and arnica. This vegetation is a common forest type. The remainder of the new disturbance would occur in sparse shrub and herbaceous cover types in previously disturbed areas. All impacts would occur within the existing developed area.

Reconfiguring the trail network throughout Areas I, II and III to separate vehicle and pedestrian circulation would cause some vegetation removal and trampling, and would have minor adverse impacts on vegetation. The development of main trails would also discourage the use of multiple social trails, thereby reducing overall vegetation trampling throughout the Swiftcurrent developed area and having a positive impact.

Constructing a fourth motel in Area I would disturb approximately 0.5 acre of ground and remove a minimal amount of vegetation. This alternative would construct three new cabin rings on the former Bath House and Motel 4 site in Area II and approximately five new cabins to complete the existing cabin rings in Area II. The construction would disturb less than 1 acre of new ground and remove a minimal amount of vegetation, and would occur in relatively small areas that have been previously developed. Adverse impacts from this activity on vegetation would be minor to negligible.

Removing parking from the inside cabin rings and providing parking along the loop road in Area II would disturb less than 1 acre and remove a minimal amount of vegetation. Impacts would be minor and adverse.

Realigning the west access road in Area III would disturb approximately 0.5 acre of ground and remove some vegetation. Because the disturbed area is small, adverse impacts on vegetation would be minor. Constructing additional visitor parking and formalizing employee parking adjacent to the Restaurant/Store in Area III would use some previously disturbed areas, including the area occupied by the existing access road. Vegetation removal would be minimal

These forest stands are dominated by lodgepole pine with some cottonwood, aspen, subalpine fir and spruce.

and would result in negligible adverse impacts on vegetation. Creating a new trailhead at the main parking area and a trail to the existing trailhead would remove less than 0.5 acre of vegetation, and impacts on vegetation would be negligible because of the small area and amount of vegetation affected.

Extending the operating dates of the visitor accommodations and Restaurant/Store three weeks (two weeks earlier and one week later) would encourage visitor use in areas when soils might still be saturated and emerging plants susceptible to trampling. The result could be damage or loss of vegetation, change in species composition and the possible spread of exotic plants. The effects would be negative, minor to moderate and long-term.

- **Alternative C.** Alternative C would disturb approximately 5 acres and restore less than 0.5 acre of ground. All disturbances would occur within the existing developed area. Applicable impacts described for alternatives A and B, including extending the operating season, would remain the same under this alternative with the following exceptions.

In Area II, alternative C constructs new employee dormitories, showers, and indoor and outdoor recreation facilities; expands employee parking; constructs a new cabin ring for employee housing; and fills in the existing employee cabin ring with one cabin. These activities would disturb between 1 and 2 acres of ground and remove some vegetation. Placement of the new employee complex would take advantage of previously developed areas, including the former Bath House site, and would have minor adverse impacts on vegetation. This area is also primarily lodgepole pine forest, similar to the vegetation described above.

- **Conclusion.** Overall, alternative A would have negligible to minor long-term, site-specific, adverse impacts on vegetation from repairs and improvements.

Alternative B would clear approximately 4 acres of vegetation and alternative C would clear approximately 5 acres. Both alternatives would use previously disturbed areas for new development and would have overall minor to moderate long-term, site-specific, adverse impacts on vegetation. Extending the operating season for both alternatives B and C would have minor to moderate, negative, long-term impacts.

There would be no significant adverse impacts on vegetation resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of vegetation resources as a result of the implementation of any of the alternatives.

Cumulative Impacts

In areas throughout and adjacent to the park, past actions such as development have affected vegetation resources. Present ongoing services within the park disturb vegetation in developed areas, along roads and trails, and near lakes and rivers. Reasonably foreseeable projects outside the park such as constructing additional employee housing, improving roads and bridges, and U.S. Forest Service timber salvaging would have localized adverse impacts on vegetation. On the other hand, projects such as Forest Service reforestation and noxious and invasive weed management would have positive impacts.

Future development projects inside the park, including the Going-to-the-Sun Road rehabilitation project that could include the removal of vegetation in areas with little or no existing disturbance, would have moderate site-specific, adverse impacts on vegetation. In addition, projects within or near the park that involve ground disturbance, as well as transportation and recreation, would contribute to the spread of invasive species on a regional scale. The combined impacts of all actions both inside and outside the park, and any of the alternatives would have an overall minor, regional, long-term, adverse cumulative impact on vegetation.

WILDLIFE, INCLUDING AQUATIC SPECIES

Methodology

Current conditions of wildlife in general were assessed through informal consultation with the U.S. Fish and Wildlife Service, and wildlife biologists from Glacier National Park and from outside the Park Service. Alternatives were evaluated on the basis of data and other information gathered from the following sources: Glacier National Park inventory, monitoring and sighting databases, as well as research information from U.S. Geological Survey scientists, universities, and independent researchers; geographic information systems (GIS) themes (provided by the park's GIS specialist); interviews with terrestrial and aquatic wildlife experts; Glacier National Park monitoring reports; and current literature.

Knowledge of ecological relationships and processes on the landscape and regional scale is well established, but knowledge of the status of wildlife populations and local conditions at the site-specific level is largely incomplete or unavailable for many areas in the park. In light of these knowledge gaps, this analysis describes impacts on wildlife in terms of changes to habitat quality, quantity and distribution, such as habitat loss or gain, degradation or enhancement, fragmentation or connectivity, amount of human disturbance, and potential for increased or decreased conditioning of wildlife.

The response of wildlife to human presence is complex, and different species of wildlife have different tolerances for interaction with humans. Tolerance levels for interaction also vary by time of year, reproductive status, age, habitat type, food availability, topography and degree of habituation. This analysis assesses potential impacts from construction and operation by season. The seasons analyzed are:

Spring (15 March – 15 June)
Summer (15 June – 15 September)
Fall (15 September – 15 November)
Winter (15 November – 15 March)



In this discussion, construction includes major repair and/or rehabilitation, demolition, deconstruction, rehabilitation, maintenance, etc. The type of construction activity (i.e., heavy or light, interior or exterior, major or minor) and the scheduling of the work (both time of day and season) are factors that influence the duration, intensity and context of the associated impacts. Any extended or increased concessioner services will also influence the duration, intensity and context of associated impacts.

Thresholds of impact are defined in Table 4.1.

- *Negligible*: Effects would be at or below the level of detection and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.
- *Minor*: Effects on wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population.
- *Moderate*: Effects on wildlife would be readily detectable and widespread, with consequences at the population level.
- *Major*: Effects on wildlife would be obvious and would have substantial consequences to wildlife populations in the region.
- *Short-term*: After implementation, would recover in less than 1 year.
- *Long-term*: After implementation, would take more than 1 year to recover or effects would be permanent.

Impacts Common to All Alternatives

Construction activities would result in short-term impacts on wildlife due to increased levels of noise, human activity, erosion, dust, artificial lighting, vegetation trampling, vegetation removal, spread of exotic species, wildlife attractants and environmental pollutants. Mitigation measures would be implemented during construction under all alternatives to minimize these impacts.

Construction activities and added concessioner services during the summer would have fewer adverse effects on wildlife. Existing development, including concessioner services, and a past history of human disturbance in these areas have already affected habitat quality in summer. Adverse effects would be more likely during spring, fall and winter when wildlife are accustomed to decreased visitor use. Many species of wildlife are more vulnerable to the effects of human-induced stress in spring, fall and winter when energy expenditure is greatest and food resources are less abundant. Sustained (year after year) construction activities during late fall, early spring and winter in the Rising Sun, Two Medicine, Many Glacier and Swiftcurrent developed areas would have greater consequences for wildlife because roads into these areas have not historically been maintained for motorized access in winter. Year-round construction at these four sites would require that seasonally closed roads be kept open throughout the winter. Increased human presence and activity at these sites in winter would result in a moderate to major impact on wildlife because of the greater likelihood of human-induced stress, displacement, harassment and habituation.

Expanding the season for construction in the Apgar Village and Lake McDonald developed areas from current dates would increase the level of human disturbance to wildlife during the sensitive spring and fall seasons, resulting in a moderate long-term, adverse impact. The proposed actions would create the following long-term adverse impacts on special status wildlife species and habitat: loss of riparian woodland and upland forest habitats, noise and light disturbance from new facilities, creation of new areas for brown-headed cowbirds, increased human disturbance in adjacent habitats, increased trampling of vegetation, increased chance of wildlife conditioning to human food, disturbance from traffic and people, increased need for hazard tree management, reducing snag habitat, and increased chance of human/wildlife conflicts.

Formalizing pedestrian pathways would have negligible, localized impacts on aquatic special status species. Sedimentation from ground disturbance would cause short-term adverse impacts, and sediments and pollutants associated with increased water run-off would cause long-term adverse impacts. Pollutants associated with increased water run-off from the sidewalks situated immediately adjacent to the waterways would create long-term adverse impacts. Formalizing and hardening pedestrian pathways along the waterways would reduce the amount of soil and vegetation available to filter sediments and pollutants in run-off from the surrounding developed areas. This could alter natural erosion processes around and in the waterways, and in some cases downstream, thereby resulting in additional adverse impacts on wildlife.

Impacts from other activities on wildlife and wildlife habitat generally would be characterized as long-term. Long-term impacts are associated with the new development in previously developed areas and operation of facilities and services or with actions resulting in the permanent modification or loss of habitat. The long-term impacts of new development on wildlife would include: habitat loss (such as plant communities, snags, down logs, etc.), habitat fragmentation and loss of connectivity, habitat modification (such as floodplain, streambank, and lakeshore stabilization), and adverse edge effects. These impacts also would entail displacement and avoidance behavior, vulnerability to poaching and illegal collection, increased potential for chronic negative interactions with humans, direct mortality from vehicles, harassment and disturbance, and disruption of wildlife movement (e.g., dispersal and migration). The introduction and spread of non-native species and degradation of rare and unique communities (such as those found in talus slopes, cliffs, caves, meadows, riparian areas and wetlands) could occur. There would also be increased levels of human-induced physiological stress, lowered success in reproduction and rearing of young, and loss of habitat complexity. Site-specific and species-specific long-term impacts are described in more detail for each alternative. Removing debris at low water from Snyder Creek in the vicinity of the bridges within the developed area would have minor adverse, short-term impacts on aquatic species.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action.** Operation of the chalet as a hiker shelter and concentration of visitor activity would have no additional effect on wildlife. Wildlife would continue to be disturbed by human activity in the area. The chalet sits at the subalpine to alpine transition zone, and the area is interspersed with high value wildlife habitats. Human/wildlife conflicts would persist because food storage and sanitation that attract wildlife would continue to be available in the area. The use of helicopters for removing waste would continue to disturb wildlife and cause minor adverse effects.
- **Alternative B (Preferred).** The very few ground disturbing activities that are proposed under this alternative would occur in a relatively small area that has been previously disturbed by human activities. As a result of the currently disturbed nature of the site and existing adjacent development, long-term adverse impacts would be negligible. Moderate short-term, adverse impacts would occur during construction due to numerous helicopter flights and the additional pack trips needed to transport construction materials. Under this alternative, removing sanitary waste by helicopter would cease, resulting in minor long-term, positive impacts on wildlife.
- **Alternative C** would have the same impacts as alternative B. However, the area disturbed by development would increase slightly under this alternative. Maintenance and operation of a full-

service dining and overnight facility would increase human use and therefore increase the levels of human disturbance to wildlife, resulting in minor long-term, adverse impacts on wildlife.

Guided Day Hiking (Cultural/Natural/Recreational)

- **Alternative A – Status Quo/No Action.** Although trained guides offer some enhancement to visitor awareness of sensitive resources and leave-no-trace backcountry travel techniques, the lack of limits to group size or number of trips per day under alternative A exacerbates wildlife disturbances. This alternative poses minor adverse impacts on wildlife resources due to continued disturbance and displacement of wildlife.
- **Alternative B (Preferred)** would limit group size for guided day hikes and the number of trips per day on high-traffic trails; however, it would also have a minor adverse impact on wildlife due to continual disturbance and displacement of wildlife.

Guided Underwater Diving Tours

- **Alternative A – Status Quo/No Action** would have no impact on wildlife because guided underwater diving tours would not occur in the park.
- **Alternative B (Preferred)** would cause minor adverse impacts on wildlife and aquatic species in and around Lakes McDonald, Sherburne and Josephine, as well as Swiftcurrent, Two Medicine, Pray, Lower Two Medicine, and St. Mary Lakes due to trampling of vegetation in aquatic habitats, increased levels of noise in remote habitats, and increased human disturbance in adjacent habitats. Additional causes would be the introduction of non-native plant and animal species, increased turbidity, sanitary waste disposal problems, the deposition of oil/gas mixtures on the water surface, and the increased chance of human/wildlife conflicts.

Firewood Sales

- **Alternative A – Status Quo/No Action** would continue firewood sales in camp stores, reducing the extent of wood gathering around campgrounds, and thereby reducing wildlife disturbances along social trails surrounding campgrounds. This operation would have a negligible beneficial impact on wildlife.
- **Alternative B (Preferred).** Although expanding firewood sales operations at developed campgrounds under this alternative might entail new short-term wildlife disturbance during construction, it would also reduce the impacts associated with visitors gathering wood from around the campgrounds, resulting in negligible long-term, beneficial impacts on wildlife.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action.** The use of large, motorized boats directly affects wildlife by displacing individuals from high-value riparian and aquatic habitats into marginal habitats where forage quality and habitat security might be lower. Wave action from boats can disturb aquatic vegetation and smaller animals that nest or live there. Indirect impacts on water quality and other habitat components also affect wildlife. Boats contribute to increased turbidity, sanitary waste disposal problems, and the deposition of oil/gas mixtures on the water surface. Continued boat tour and transportation services would continue to have minor adverse impacts on wildlife.

- **Alternative B (Preferred).** Impacts under this alternative would not dramatically increase in the Lower McDonald Creek drainage due to added tour boat services on Lake McDonald. Impacts would be minor and adverse.

Horseback Riding and Horse Packing Services

- **Alternative A – Status Quo/No Action (Preferred).** Horseback riding and horse packing services would continue to cause minor to moderate adverse impacts on wildlife due to trampling of habitat along trails, noise in remote habitats, and human disturbance in adjacent habitats. Additional impacts occur from are influx of nutrients from livestock droppings and urine, wildlife conditioning to human and livestock food, spread of non-native plant species affecting wildlife habitat, human/wildlife conflicts and spread of disease.
- **Alternative B** would have the same impacts as alternative A, but would result in a reduction of impacts associated with guided horseback riding on trails originating from the Apgar stables.
- **Alternative C** would have the same impacts as alternative A, with an increase in impacts in the Two Medicine and St. Mary areas due to added horseback riding services.
- **Alternative D** would have the same impacts as alternative A, but would result in a reduction of impacts for guided horseback riding and horse packing in the Lake McDonald area.

Conclusion

Alternative A for Granite Park Chalet would continue to have minor long-term, site-specific, adverse impacts on wildlife. Alternative B would have negligible long-term, site-specific, impacts from wildlife disturbance and displacement, while alternative C would have minor long-term, site-specific impacts. In addition, alternatives B and C would cause minor long-term, site-specific, positive impacts because hauling of sanitary waste by helicopter would cease.

Alternative B for guided day hiking would have a less negative impact on wildlife than alternative A because it limits group sizes and the number of trips per day on high-traffic trails. Although both alternatives would have minor long-term, localized, adverse impacts on wildlife from human disturbances, alternative B's impacts would be less due to the limited number of visitors at any given time.

Under alternative A, guided underwater diving tours would not be available in the park; therefore, there would be no impact on park wildlife. Alternative B would have minor long-term, localized, adverse impacts on wildlife.

Alternatives A and B for firewood sales would result in overall negligible long-term, site-specific, positive impacts on wildlife near campgrounds by reducing disturbances from visitors gathering wood.

Alternatives A and B for boat tours and transportation (boat taxi) would have minor long-term, localized, adverse impacts from wildlife disturbance.

Alternatives A, B and D for horseback riding and packing services would have overall minor to moderate, long-term, localized, adverse impacts. Impacts for alternative C would be the same as for alternative A, with the addition of localized impacts in the Two Medicine and St. Mary areas.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

Apgar Village Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse impacts on wildlife during construction due to noise and movement.

If implemented during the current maintenance and operating season, this alternative would have no new effect on wildlife.

- **Alternative B (Preferred).** Impacts described for Alternative A would remain the same under this alternative.

This alternative involves approximately 2.5 acres of new disturbance and would restore over 0.5 acre.

Plans to improve pedestrian pathways and roadways in the developed area and to renovate the Village Inn would affect a relatively small area previously disturbed by human activities. Converting a social trail and utility corridor to a new bike path between Apgar Village and the campground would result in a negligible impact, since the area is already disturbed. This social trail already appears to receive regular use by visitors traveling to and from the campground in summer. The impacts of trail construction would be short-term and negligible to minor, depending on the season. If construction occurred in the summer, impacts would be negligible. If construction occurred during the spring, fall or winter, impacts would be short-term and have greater adverse effects because these are sensitive seasons for most wildlife in Glacier National Park, and the trail runs through habitat occupied by wildlife. Constructing new parking lots in the Apgar area would adversely affect about 2.5 acres of undeveloped land and result in a long-term adverse impact. Construction of the parking lots and other visitor-related items in the summer would have short-term and less adverse impacts. Construction in the spring, fall and winter would have moderately adverse impacts on wildlife.

Extending the operating season of the Village Inn eight weeks (three weeks earlier and five weeks later) could affect wildlife by encouraging more visitor use in the early and late season at Apgar. Early in the year, nesting birds could be affected and the total time extension could affect migrating aquatic avian species that use the foot of Lake McDonald. Other species could be displaced within and adjacent to the developed area during the sensitive spring and fall seasons. Increased activity during the spring and fall could affect energy expenditure and productivity, and increase mortality. Overnight users might also impact other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor and long-term.

- **Alternative C.** Impacts described for alternatives A and B, including extending the operating season, would remain the same under this alternative with the following exceptions.

Removing the Village Inn and constructing a public space at this site adjacent to the Lake McDonald outlet would result in minor to moderate long-term, adverse impacts on wildlife. Although the continued use of the area by residents from the Inn would be eliminated, visitor use at the lake outlet would likely increase the amount of human disturbance to important wildlife habitat.

The construction of the new parking lots and new visitor lodging would result in a greater likelihood of measurable but minor losses of habitat quality and quantity at Apgar relative to alternatives A and B. Consequently, moderate long-term, adverse effects on wildlife would be expected to occur as a result of the proposed actions in the Apgar Village developed area.

Proposed construction activities would result in minor short-term impacts in summer, and moderate short-term impacts in spring, fall and winter.

- **Conclusion.** Alternative A would have minor short-term, localized adverse impacts on wildlife during construction. Under alternative B, the construction of new parking lots would result in a greater likelihood of measurable but minor losses of habitat quality and quantity in the Apgar Village developed area than would alternative A. Consequently, minor long-term, adverse impacts on wildlife would result from the proposed actions in the Apgar Village developed area. The construction of the new parking lots and new visitor lodging under alternative C would result in a greater likelihood of measurable losses of habitat quality and quantity in the Apgar Village developed area relative to alternatives A and B. Consequently, moderate long-term, adverse impacts on wildlife would result from the proposed actions. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse impacts during implementation. If implemented during the current maintenance and operating season, this alternative would have no new effect on wildlife.
- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Removing several structures (Boys' Dormitories 1 and 2, and Johnson, Jammer and Hydro Dormitories from Area I, as well as the existing Coffee Shop parking lot and Girls' Dormitories 1 and 2 from Area II) and revegetating would have a negligible impact on wildlife, given the small area restored and the proximity of adjacent development. Removal of these facilities might slightly reduce the need to remove hazard trees from within the Snyder Creek floodplain. This alternative would result in a slight decrease in the number of guests and/or employees at this site.

The new employee housing area proposed near the Coffee Shop would result in expanded human presence in the adjacent forested habitat; however, human presence and adjacent development have previously disturbed this area. Short-term impacts associated with construction would also be moderate during all seasons. Parking lot and road improvement projects north of Snyder Creek would have minor to moderate, long-term impacts due to loss of habitat. Impacts from construction would be minor and short-term if construction occurs in summer. If construction were scheduled during spring, fall or winter, impacts would be of minor to moderate and short-term because these are sensitive seasons for most wildlife in Glacier. Construction of new facilities south of Snyder Creek would result in the removal of an important vegetation type (western redcedar and black cottonwood mature forest); this action would result in moderate long-term, adverse impacts. Construction activities would cause short-term adverse impacts, which would be negligible to minor if work were scheduled in summer, and minor to moderate in spring/fall/winter (depending on the proximity of the project site to sensitive habitats). Construction planned for buildings located immediately adjacent to Snyder Creek or Lake McDonald would have a greater potential to impact wildlife than would construction in areas nearer to the Going-to-the-Sun Road.

Extending the operating season of the Lake McDonald Lodge, General Store, Coffee Shop and other visitor accommodations five weeks (two weeks earlier and three weeks longer) would displace wildlife from habitat within and adjacent to the developed area during sensitive spring and fall seasons. Increased activity during this time could affect energy expenditure and productivity, and increase mortality. Overnight visitors might also impact other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Constructing a new access road and parking adjacent to the guest cabin units in Area II would increase the loss of wildlife habitat and the amount of wildlife disturbances in the area, having an overall minor long-term, localized, adverse impact.

- **Conclusion.** Overall, alternative A would have a minor long-term, localized, adverse impact on wildlife and wildlife habitat from developing paths. Although alternative C would result in a greater amount of new development and some increase in loss of habitat, both alternatives B and C would have overall minor to moderate, localized, long-term, adverse impacts on wildlife. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

The St. Mary Valley is winter range for elk and other ungulates.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse impacts during implementation. If implemented during the current maintenance and operating season, this alternative would have no new effect on wildlife.

- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Removal of boat concession housing from the St. Mary Lake shoreline would result in the restoration of some lakeshore habitat, resulting in a negligible long-term, positive impact on wildlife.

Stabilizing the bluff where historic guest cabins are located above Rose Creek would cause minor short-term, adverse impacts on wildlife due to construction. Constructing five new cabins with parking in Area I, as well as a new employee dormitory with parking and an outdoor recreation facility, would result in some increased loss in wildlife habitat; thus, the impacts would be minor to moderate and long-term.

The short-term impacts of construction would be minor to moderate, depending on the construction schedule. Winter work would require the park to plow the Going-to-the-Sun Road so that construction crews could access the site at a time of year when this segment of the road is normally closed. The St. Mary Valley is winter range for elk and other ungulates. Increased human disturbance of wintering wildlife could result in displacement, greater energy expenditure, decreased productivity, and increased mortality. These impacts on ungulate populations would likewise impact carnivores that rely on these prey species (mountain lions, gray wolves, coyotes, grizzly bears, black bears, and wolverine). Maintenance of the road in winter would also increase the potential for poaching and illegal collection of wildlife.

Extending the operating season of the visitor overnight accommodations, Coffee Shop and General Store/Motel/Dormitory five weeks (three weeks earlier and two weeks longer) would displace wildlife species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. Increased activity during the spring and fall could affect energy expenditure and productivity, and increase mortality. Overnight visitors may also impact other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Constructing ten new cabins and associated parking, and two new employee dormitories including an outdoor recreation facility in Area I would result in loss of wildlife habitat, creating minor to moderate adverse impacts.

- **Conclusion.** Overall, alternative A would have a minor short-term, localized, adverse impact on wildlife. Overall impacts for alternative B would be minor to moderate long-term, localized, and adverse from construction and development. Extending the operating season for both alternatives

B and C would have minor negative, long-term impacts. Although alternative C would result in more development than would alternative B, overall adverse impacts from development under this alternative would also be minor to moderate long-term, and localized. There would be more habitat loss under alternative C than under alternative B.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would result in minor to negligible short-term, adverse impacts during implementation.
- **Alternative B.** Impacts described under alternative A also apply to this alternative. Under this alternative, several small ground-disturbing activities are proposed that would occur mainly in areas previously disturbed by human activities. As a result of the currently disturbed nature of the sites and existing adjacent development, long-term adverse impacts would be negligible to minor. Short-term adverse impacts associated with maintenance, repairs and construction would be negligible if work occurs in summer. If construction is scheduled during spring or fall, short-term impacts would be of moderate intensity (construction would not occur in winter at this site). Work scheduled in late fall or early spring would require the park to plow the Two Medicine Road so that construction crews could access the site at a time of year when this road is often closed. The Two Medicine Valley contains year-round range for bighorn sheep and other ungulates. Increased human-caused disturbance to wildlife in early spring could result in displacement, greater energy expenditure, decreased productivity, and increased mortality. Impacts on ungulate populations would likewise impact carnivores that rely on these prey species (mountain lions, gray wolves, coyotes, grizzly bears, black bears, and wolverine). Maintenance of the road in these seasons would also increase the potential for poaching and illegal collection of wildlife.

Extending the operating season for the General Store four weeks (one week earlier and three weeks later) might displace some wildlife species adjacent to the store, but the effects would be negligible, negative and long-term.

- **Conclusion.** Overall, alternative A would have minor short-term, localized, adverse impacts on wildlife from repairs and improvements, and alternative B would have an overall minor long-term, localized, adverse impact on wildlife due to wildlife disturbance and displacement. Extending the operating season in alternative B would have negligible negative, long-term impacts.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor to negligible short-term, adverse impacts during implementation.
- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Very few ground-disturbing activities are proposed under this alternative, and those described would occur in a relatively small area previously disturbed by human activities. As a result of the currently disturbed nature of the site and adjacent development, long-term adverse impacts would be negligible. Plans to improve employee outdoor recreation opportunities would have minor to moderate long-term, adverse impacts depending on the size and location of the project site. Short-term adverse impacts would occur because of construction activities. Short-term adverse impacts associated with construction for all proposed actions would likely be negligible if work occurs in summer. If construction is scheduled during spring, fall, or winter, short-term impacts would be of minor to moderate intensity in spring/fall and moderate to major intensity in winter. Winter work could require the park to plow the Many Glacier Road so that construction crews could access the site at a time of year when this road is normally closed. The Many Glacier Valley contains year-round range for bighorn sheep and other ungulates. Increased human-caused disturbance to wildlife in early spring could result in displacement, greater energy expenditure, decreased productivity, and increased mortality. Impacts on ungulate populations would likewise impact carnivores that rely on these prey species (mountain lions, gray wolves, coyotes, grizzly bears, black bears, and wolverine). Maintenance of the road in these seasons would also increase the likelihood of poaching and illegal collection of wildlife.

Extending the operating dates of the Many Glacier Hotel and other accommodations two weeks (one week earlier and one week later) would affect wildlife by displacing species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. To open the hotel and related facilities, the staff is usually present in the valley five to six weeks prior to opening. Increased activity in the spring and fall could affect energy expenditure and productivity, and increase mortality. Overnight visitors might also affect wildlife in nearby areas since the duration and time of their stay would be different than for day users. The effects would be more pronounced because the operating seasons for both the Many Glacier and Swiftcurrent facilities would be extended, since they are in the same valley. The effects would be negative, minor and long-term.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Constructing a new dormitory and outdoor recreational facility in Area II would result in a moderate, long-term adverse impact on wildlife and wildlife habitat because they would be constructed within an important wildlife corridor.

- **Conclusion.** Overall, alternative A would have a minor long-term, localized, adverse impact on wildlife from disturbance and temporary displacement. Alternative B would result in an overall minor, long-term, localized, adverse impact. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts. Alternative C would have the greatest

overall adverse impact, with disturbances and loss of wildlife habitat resulting in impacts that would be minor to moderate long-term, and localized.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse impacts on wildlife during implementation.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative.

Obliterating a short segment of paved road would result in the eventual restoration of a small amount of forested habitat. This would have a negligible long-term impact on wildlife, given the small area affected and the proximity of adjacent development.

Constructing new guest cabins and a new motel would have minor to moderate long-term, adverse impacts on wildlife because some forested habitat would be removed. Constructing new parking lots would likewise result in a minor loss of forested habitat. Most of the other proposed ground-disturbing activities would occur in a relatively small area that has been previously disturbed by human activities. As a result of the currently disturbed nature of the site and existing adjacent development, long-term impacts would be negligible. Short-term impacts would occur because of construction activities. For all proposed actions, these impacts would likely be negligible to minor if work occurs in summer. If construction is scheduled during spring, fall, or winter, short-term impacts would be of moderate intensity in spring/fall and moderate to major intensity in winter. Winter work would require the park to plow the Many Glacier Road so that construction crews could access the site at a time of year when this road is normally closed. The Many Glacier Valley contains year-round range for bighorn sheep and other ungulates. Increased human-caused disturbance to wildlife in early spring could result in displacement, greater energy expenditure, decreased productivity, and increased mortality. Impacts on ungulate populations would likewise impact carnivores that rely on these prey species (mountain lions, gray wolves, coyotes, grizzly bears, black bears, and wolverine). Maintaining access into these areas during these seasons would also increase the likelihood of poaching and illegal collection of wildlife.

Extending the operating dates of the visitor accommodations and Restaurant/Store three weeks (two weeks earlier and one week later) would displace wildlife species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. To open the motel and related facilities, the staff is usually present in the valley 5-6 weeks prior to opening. Increased activity during this time could affect energy expenditure and productivity, and increase mortality. Overnight visitors might affect wildlife in other nearby areas since the duration and time of their stay would be different than for day users. The effects would be more pronounced by extending operation dates of both the Many Glacier and Swiftcurrent facilities, since they are in the same valley. The effects would be negative, minor and long-term.

- **Alternative C.** Impacts for this alternative would be the same as described under alternative B.
- **Conclusion.** Overall, alternative A would have minor to negligible short-term, localized, adverse impacts on wildlife from repairs and improvements. Alternatives B and C would result in roughly the same amount of impact on wildlife. Both alternatives would have an overall minor to moderate long-term, localized, adverse impact on wildlife habitat due to habitat loss and wildlife displacement. Extending the operating season for both alternatives B and C would have minor negative, long-term impacts.

There would be no significant adverse impacts on wildlife whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of wildlife as a result of the implementation of any of the alternatives.

Cumulative Impacts

During the history of Glacier National Park, development to accommodate visitors and steady growth in park visitation have affected wildlife through loss of habitat and disturbance from increased human presence. Impacts on wildlife extend beyond physical boundaries because some species are less likely to use habitats near heavily used areas such as roads, trails, campgrounds and other developments.

In areas throughout and adjacent to the park, past actions such as development have affected wildlife. Present ongoing services within the park disturb wildlife habitat in developed areas, along roads and trails, and near lakes and rivers, contributing to habitat displacement. Reasonably foreseeable projects outside the park such as constructing additional employee housing, improving roads and bridges, and U.S. Forest Service timber salvaging and trail construction would have localized adverse impacts. Future development projects inside the park, including the Going-to-the-Sun Road rehabilitation project that could include the loss of habitat in areas with little or no existing disturbance, would have moderate site-specific, adverse impacts. The combined impact of all actions both inside and outside the park, and any of the alternatives would have an overall minor to moderate long-term, regional, adverse cumulative impact on wildlife.

THREATENED AND ENDANGERED / STATE LISTED SENSITIVE SPECIES



USNPS Photo

Wildlife

Methodology

Methodology for threatened and endangered species, and state listed sensitive species was consistent with the methodology described previously for wildlife, including aquatic species.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* The alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of

any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in U.S. Fish and Wildlife Service terms.

- *Minor:* The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. Minor effect would equate with a "may affect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.
- *Moderate:* An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long-term consequence to individuals, population, or habitat. Moderate effect would equate with a "may affect" in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely" or "not likely to adversely affect" the species.
- *Major:* An individual or population of a listed species, or its critical habitat, would be noticeably affected with a vital consequence to the individual, population, or habitat. Major effect would equate with a "may affect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species or critical habitat.
- *Short-term:* After implementation, would recover in less than 1 year.
- *Long-term:* After implementation, would take more than 1 year to recover or effects would be permanent.

Impacts Common to All Alternatives

Removing debris from Snyder Creek would have minor adverse, short-term impacts on bull trout from potential sediment. Removal would be done at low water and by cutting debris rather than by digging it out to reduce the potential for sediment releases.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action** would have no additional impacts on threatened and endangered wildlife.

This alternative would not alter habitat or change human-use patterns in or near areas that likely would be occupied by the following species.

- Bald Eagle. Since adherence to helicopter flight guidelines would ensure that helicopter flights maintain a minimum distance from active eagle nests in order to mitigate disturbance to bald eagles and their young, this alternative would have no additional effect on the bald eagle.
- Grizzly Bear. No measurable change to existing habitats would occur.
- Gray Wolf. Disturbance associated with ongoing maintenance activities is not expected to influence ungulate population trends in distribution. Therefore, no additional impacts to the gray wolf are expected.
- Canada Lynx. Neither alteration of vegetation within the developed area, nor changes in human activity patterns associated with construction and maintenance are expected to

influence prey species population trends in distribution, human access levels, or the range of lynx competitors and/or predators.

- Bull Trout. Although fuel or cargo spills in Upper McDonald Creek from the helicopter could have adverse effects on habitat, with mitigation, there should be no effect.

No additional effects would occur to state listed sensitive species since the operation would not change.

- **Alternative B (Preferred).** Noise of numerous helicopter flights and human activities associated with pack trips needed to transport construction materials could cause minor to moderate short-term, adverse impacts to the bald eagle and grizzly bear, and possibly the gray wolf and Canada lynx during construction. Under this alternative, the practice of removing sanitary waste by helicopter would cease, resulting in minor long-term, positive impacts due to elimination of helicopter noise and potential human interference.

- Bald Eagle. Following helicopter flight guidelines would ensure that the flights would maintain a minimum distance from active eagle nests in order to mitigate disturbance to bald eagles and their young. Increased helicopter traffic would result in a minor negative impact on the bald eagle.
- Grizzly Bear. Additional disturbance of forest and meadow habitats would result in the minor loss of grizzly bear habitat. The overall impact on grizzly bears from flights and construction activity would be moderate, short-term and negative.
- Gray Wolf. Gray wolves are rarely sighted in the vicinity of the Granite Park Chalet. This alternative would alter habitats and human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future and would have minor, negative effects on gray wolves during construction.
- Canada Lynx. This alternative would alter habitats and human use patterns in or near suitable denning habitat. Alteration of vegetation within the developed area, and changes in human activity patterns associated with construction and maintenance might be expected to influence prey species population trends in distribution, human access levels, or the range of Canada lynx competitors and/or predators. Overall, the impact to lynx could be moderate, short-term and negative.
- Bull Trout. Although fuel or cargo spills in Upper McDonald Creek from the helicopter could have adverse effects on habitat, with mitigation, there should be no effect.

Construction work and related helicopter flights could have moderate to major, short-term, adverse impacts on wolverine and golden eagles, and displace or disturb numerous sensitive bird species.

- **Alternative C** would have the same impacts as alternative B. The area disturbed by development would also increase slightly under this alternative, and maintenance and operation of a full-service dining and overnight facility, more support and horse trips, flights and construction could result in increased levels of human disturbance to the bald eagle, grizzly bear, gray wolf, and Canada lynx. There would be no effect on bull trout.

Construction work and related helicopter flights could have moderate to major, short-term, adverse impacts on wolverine and golden eagles, and displace or disturb numerous sensitive bird species. The effects would be greater for alternative C than B because of more disturbance and the need for more frequent support trips for the chalet.

Guided Day Hiking (Cultural/Natural/Recreational)

- **Alternative A – Status Quo/No Action.** Day hiking directly affects wildlife by displacing it from high value habitats into marginal habitats where security and forage quality might be lower. Although trained guides would enhance visitor awareness of sensitive resources and leave-no-trace backcountry travel techniques, the lack of limits to group size or number of trips per day would exacerbate wildlife disturbances. The threatened and endangered species below and their habitat use would continue to be affected by the presence of day hikers in remote habitats throughout the park. These conditions would result in minor adverse impacts due to disturbance and displacement. However, no measurable changes to existing habitats would occur.
 - Bald Eagle. Existing conditions would continue to degrade gradually as a result of continued concentrated and radiating human use.
 - Grizzly Bear. This alternative would not change human-use patterns in or near areas that would likely be occupied by grizzly bears. Existing conditions would continue to degrade gradually as a result of continued concentrated and radiating human use.
 - Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Existing conditions would continue to degrade gradually as a result of continued concentrated and radiating human use.
 - Canada Lynx. This alternative would not result in the alteration of vegetation, or changes in human activity that could influence prey species population trends in distribution, human access levels, or the range of lynx competitors and/or predators.
 - Bull Trout. There would be no additional effects on the species or its habitat.

There would be no additional effects on state listed, sensitive species, but hiking groups could disturb and displace many sensitive species from their habitat. Good interpretive information and programs could have a positive benefit for sensitive species.

- **Alternative B** would limit group size for guided day hikes and the number of trips per day on high-traffic trails, but would also disturb and displace the bald eagle, grizzly bear gray wolf, and Canada lynx as in alternative A, having a minor adverse impact. There would be effect on bull trout.

Hiking groups could disturb and displace many state listed, sensitive species from their habitat, but in general, smaller groups would be less disruptive. Good interpretive information and programs could have a positive benefit for sensitive species.

Guided Underwater Diving Tours

- **Alternative A – Status Quo/No Action** would have no impact on any threatened and endangered or state listed sensitive species because guided underwater diving tours would not occur in the park.

Alternative B (Preferred). In and around Lakes McDonald, Sherburne and Josephine, and Swiftcurrent, Two Medicine, Pray, Lower Two Medicine and St. Mary Lakes, this alternative could result in trampling of vegetation in aquatic habitats, increased levels of noise in remote habitats, and increased human disturbance in adjacent habitats. It could also result in the introduction of non-native plant and animal species, increased turbidity, sanitary waste disposal problems, the deposit oil/gas mixtures on the water surface, and increased chance of human conflicts with threatened and endangered species. These would cause minor adverse impacts.

There could be minor to moderate effects to sensitive duck species from boat and diving activities, and to species using riparian areas if tours occurred close to shore.

- Bald Eagle. Diving activity and boats transporting divers could disturb bald eagles in foraging, breeding and wintering areas, particularly on popular lakes. The effects could be moderate, negative and short-term at those locations.
- Grizzly Bear. Diving activity close to shore and boats transporting divers could displace grizzly bears. The overall effect would be minor, adverse and short-term.
- Gray Wolf. This alternative could result in increased levels of visitor use in gray wolf habitat. Wolves are most sensitive to human disturbance at den and rendezvous sites (visitor access to these areas could be limited by seasonal closures to protect denning wolves). Ungulates could experience shifts in distribution as a response to increased levels of human disturbance. Any impacts to ungulates would be an indirect impact on gray wolves. Overall, this alternative would result in a minor and negative impact.
- Canada Lynx. Actions that adversely affect lynx would include higher levels of human access into lynx habitat and human activity at or near den sites. These actions would result in modified forested habitat, expanded range of competitors and/or predators, or reduced prey species populations, resulting in a minor, negative impact on the lynx and lynx habitat.
- Bull Trout. Underwater tours could have a minor effect on bull trout in Lake McDonald and St. Mary Lake. Operating plans would prohibit use in sensitive areas.

Firewood Sales

- **Alternative A – Status Quo/No Action** would continue firewood sales in campstores and would continue to have a negligible, long-term, positive effect on threatened and endangered species because campers would be less likely to disturb wildlife habitat by removing logs, trees, and branches for firewood. There would be no additional effects on sensitive species.
- **Alternative B (Preferred)**. Expanded firewood sales operations at developed campgrounds as well as campstores would mean that campers would be less likely to disturb threatened and endangered wildlife habitat by removing logs, trees, and branches for firewood; therefore, this alternative would have a negligible, long-term, positive effect. There may be a negligible, long-term improvement in habitat if more people are discouraged from illegal firewood gathering by the increased availability of firewood for sale.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action**. Continued boat tour and transportation services would have no additional impacts on threatened and endangered species. No measurable change to existing habitats would occur. Continuation of commercial boat tours at Lakes McDonald and Josephine, and Two Medicine, St. Mary, Waterton, and Swiftcurrent Lakes would continue to negatively impact threatened and endangered species at those locations by displacement. However, this alternative also has a positive effect on wildlife because the educational value of the presence of a knowledgeable and experienced guide would result in positive impacts to human/wildlife interactions.

There would be no additional effects to sensitive species from current activities.

- Bald Eagle. Bald eagles nesting or foraging at these six lakes would continue to be disturbed by commercial tour boat operations, and eagles would continue to be displaced from optimal habitats by boat activity at these lakes.

- Grizzly Bear. This alternative would not alter grizzly bear habitat, nor change human-use patterns in or near areas that would likely be occupied by grizzly bears.
 - Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Disturbance associated with ongoing commercial tour boat operations is not expected to influence ungulate population trends in distribution.
 - Canada Lynx. This alternative would not result in the alteration of vegetation, or changes in human activity that could influence prey species population trends in distribution, human access levels, or the range of lynx competitors and/or predators.
 - Bull Trout. There would be no change in effects from existing conditions.
- **Alternative B (Preferred)**. – Impacts noted in alternative A would apply to this alternative as well. Adding boats to Lake McDonald would have negligible, temporary effects on bull trout. Lengthening the dock would have minor, temporary, adverse effects on bull trout during construction from sediment. Adding boats to Lake McDonald and Two Medicine Lake, and new landings at Apgar could increase displacement of sensitive aquatic and bird species. Effects would be minor, long term and adverse.

Horseback Riding and Horse Packing Services

- **Alternative A – Status Quo/No Action (Preferred)**. No additional effects are expected in this alternative. Horseback riding and horse packing services would continue to cause minor to moderate, adverse impacts on some threatened and endangered species due to trampling of vegetation along trails, noise in remote habitats, human disturbance in adjacent habitats, and trail erosion. This alternative would also result in the continued influx of nutrients from livestock droppings and urine, continued sedimentation in streams and lakes, continued spread of non-native plant species, and human/wildlife conflicts. For the bald eagle, grizzly bear and gray wolf, existing conditions would not change. No measurable change to existing habitats would occur. The continued presence of a knowledgeable and experienced guide would continue to result in positive impacts to human/wildlife interactions. This alternative would continue to affect wildlife use of aquatic and terrestrial habitats throughout the park (with impacts concentrated in the vicinity of Many Glacier, Apgar, Granite Park Chalet, Sperry Chalet, and the Lake McDonald Lodge).

There would be no additional effects on sensitive species.

- Bald Eagle. No additional effects.
 - Grizzly Bear. This alternative would not alter grizzly bear habitat, nor change human-use patterns in or near areas that would likely be occupied by grizzly bears.
 - Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Disturbance associated with ongoing guided horseback riding and horse packing is not expected to influence ungulate population trends in distribution.
 - Canada Lynx. Additional impacts to the lynx are not anticipated. This alternative would not result in the alteration of vegetation, or changes in human activity that could influence prey species population trends in distribution, human access levels, or the range of lynx competitors and/or predators.
 - Bull Trout. No new impacts would occur.
- **Alternative B** would have the same impacts as alternative A, but would result in a reduction of impacts due to the elimination of guided horseback riding on trails originating from the Apgar

stables. This alternative would have a minor to moderate, long-term positive impact on these species at Apgar. There would be an overall minor to moderate reduction in impacts if rides were discontinued in the Apgar area, including those to aquatic avian species along Lower McDonald Creek.

- Bald Eagle. Bald eagles foraging or roosting along Lower McDonald Creek and the foot of Lake McDonald would not be disturbed by large groups on guided horse trips.
 - Grizzly Bear. Grizzly bears foraging, resting, or traveling in the Lower McDonald Valley would not be disturbed by large groups on guided horse trips.
 - Gray Wolf. Gray wolves hunting or traveling in the Lower McDonald Valley would not be disturbed by large groups on guided horse trips.
 - Canada Lynx. Canada lynx hunting or traveling in the Lower McDonald Valley would not be disturbed by large groups on guided horse trips.
 - Bull Trout. Small reductions in nutrients and sediment could result from the discontinuation of rides in the Lower McDonald Valley. This would be a minor beneficial, long-term effect.
- **Alternative C** would have the same impacts as alternative A with an increase in impacts in the Two Medicine and St. Mary areas due to added horseback riding services in those areas. For all the threatened and endangered species listed below, the same impacts described for alternative A would continue under alternative C at all sites except Two Medicine and St. Mary where impacts would be increased due to the expansion of guided horseback riding services in these areas. This alternative could have moderate to major, long-term, negative impacts on these species, except the gray wolf, at Two Medicine and St. Mary. There would be an overall minor to moderate increase in impacts on sensitive species due to temporary disturbance if rides were added in the St. Mary and Two Medicine areas.
 - Bald Eagle. Bald eagles foraging, nesting, and roosting along in Two Medicine and St. Mary could be disturbed by large groups on guided horseback rides.
 - Grizzly Bear. Grizzly bears foraging, resting, and traveling in Two Medicine and St. Mary could be disturbed by large groups on guided horseback rides.
 - Gray Wolf. Gray wolves hunting, denning, and traveling in Two Medicine and St. Mary could be disturbed by large groups on guided horseback rides. This alternative would have moderate long-term, negative impacts on the gray wolf.
 - Canada Lynx. Canada lynx hunting, denning, and traveling in Two Medicine and St. Mary could be disturbed by large groups on guided horseback rides.
 - Bull Trout. Additional horseback rides in St. Mary could have minor long-term, adverse impacts.
 - **Alternative D** would have the same impacts as alternative A, but would result in a reduction of impacts associated with guided horseback riding and horse packing in the Lake McDonald area due to the removal of the stable and discontinued rides in the Upper McDonald Valley. For the threatened and endangered species below except the gray wolf, this alternative would have a minor long-term, positive impact at Lake McDonald. There would be a minor to moderate decrease in impacts, including those to harlequin ducks, from the closure of the Lake McDonald corral and discontinuation of rides up the Upper McDonald Valley. The effects would be long-term and positive.
 - Bald Eagle. Bald eagles foraging, nesting, or roosting at Lake McDonald would not be disturbed by large groups on guided horseback riding trips.

- Grizzly Bear. Grizzly bears foraging, resting, or traveling in the Upper McDonald Valley would not be disturbed by large groups on guided horseback riding trips.
- Gray Wolf. Gray wolves hunting or traveling in the Upper McDonald Valley would not be disturbed by large groups on guided horse trips. This alternative would have a negligible long-term, positive impact on gray wolves at Lake McDonald.
- Canada Lynx. Canada lynx hunting or traveling in the Lower McDonald Valley would not be disturbed by large groups on guided horse trips.
- Bull Trout. This alternative would reduce some nutrient loading and sedimentation to Lake McDonald and the upper valley, resulting in a beneficial, long-term effect.

Conclusion

Alternative A for Granite Park Chalet would have no additional impacts. Alternative B would have moderate short-term, adverse impacts on threatened and endangered species from disturbance and displacement, and alternative C would have the same impacts. In addition, the cessation of hauling sanitary waste by helicopter under alternatives B and C would cause minor long-term, positive impacts

Although alternative B for guided day hiking would have a less negative impact on threatened and endangered species than alternative A because it limits group sizes and the number of trips per day on high-traffic trails, human disturbances would have minor adverse impacts on some threatened and endangered species.

Under alternative A, guided underwater diving tours would not be available in the park; therefore, there would be no impact on park threatened and endangered species. Alternative B would have minor, adverse impacts.

Alternatives A and B for firewood sales would result in overall negligible long-term, positive impacts on threatened and endangered species near campgrounds by reducing disturbances from visitors gathering wood.

Alternative B for boat tours and transportation (boat taxi) would have minor, long-term effects on Lake McDonald. Alternative B would have increased negative effects on bald eagles at Lake McDonald and Waterton Lakes, and minor to moderate effects on Two Medicine Lake from disturbance caused by increased boat tours.

Alternatives B and D for horseback riding and packing services would have overall minor to moderate, localized, positive impacts. Impacts for alternative C would be the same as for alternative A, with the addition of localized impacts in the Two Medicine and St. Mary areas.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of threatened and endangered species as a result of the implementation of any of the alternatives.

Apgar Village Developed Area

- **Alternative A – Status Quo/No Action.** The current conditions described in Chapter 3 Affected Environment would be maintained, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have negligible to minor short-term, adverse impacts

during implementation to the grizzly bear, bald eagle, gray wolf, Canada lynx and bull trout. The small number of ground disturbing activities under this alternative would occur in a relatively small area that is previously disturbed by human activities. As a result of the disturbed nature of the site and adjacent development, long-term impacts would be negligible for all of the threatened and endangered species listed below except the bull trout.

- Bald Eagle. No other changes would occur.
- Grizzly Bear. This alternative would not affect grizzly bear habitat, nor change human-use patterns in or near areas that would likely be occupied by grizzly bears.
- Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future.
- Canada Lynx. This alternative would not change the existing conditions associated with this species; therefore, additional impacts to the lynx are not anticipated.
- Bull Trout. Formalizing and hardening pedestrian pathways along the shoreline would reduce the amount of lakeside soil and vegetation available to filter sediments and pollutants in runoff from the surrounding developed area. Developing hardened pathways along the shoreline would increase localized runoff and would have a minor long-term, adverse impact. An increase in human use at the outlet could have minor impacts.

There would be no additional effects on sensitive species.

- **Alternative B (Preferred)**. This alternative would have the same negligible to minor, short-term impacts as described in alternative A. However, any construction in the spring, fall and winter would have moderate adverse impacts, since these are sensitive seasons for most threatened and endangered species in the park. Adverse impacts would be negligible to minor and short-term, depending on the season of trail construction. If construction occurs in the summer, impacts would be negligible. Construction of the parking lots and other visitor-related facilities in the summer would have less adverse, short-term effects. However, construction during this season on trails that run through habitat that could be occupied by threatened and endangered species would have greater adverse effects.

Construction during spring, fall or winter could result in the alteration of human-use patterns in or near areas that would likely be occupied by grizzly bears, which could lead to an increased chance of conditioning bears to human food and creating human/bear conflicts, thereby creating a moderate, adverse impact.

Construction work in late or early season could potentially have short-term adverse impacts on wolverine. Additional parking lots may result in a minor loss of habitat from clearing and hazard tree removal for sensitive bird species dependent on mature trees or snags. The result would be minor negative, long-term effects.

Extending the operating season of the Village Inn eight weeks (three weeks earlier and five weeks later) could affect threatened, endangered and sensitive wildlife species by encouraging more visitor use in the spring and fall at Apgar. This could displace or alter travel routes for grizzly bears, Canada lynx and wolves. This could also disturb bald eagles roosting and feeding along McDonald Creek. Increased activity during the spring and fall could affect energy expenditure, productivity and increase mortality. Overnight visitors might also impact other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor to moderate and long-term.

- **Alternative C.** Impacts described for alternatives A and B, including extending the operating season, would remain the same under this alternative with the following exception: replacing the Village Inn with a formalized public space may increase the amount of human disturbance to the bull trout at the outlet and along Lower McDonald Creek in spring, fall and winter, resulting in a minor long-term impact.

Impacts on sensitive species would be the same as in alternative B, but removal of the Village Inn would have minor to moderate, adverse impacts on sensitive species using the outlet, lower lake and riparian area including several duck species and loss of habitat for some bird species with the relocation. Minor to moderate adverse, long-term effects would result.

- **Conclusion.** All alternatives would have minor short-term, localized adverse impacts on threatened and endangered species as well as minor long-term, localized adverse impacts on the bull trout. Alternative B may have moderate adverse impacts during any construction that occurs in the spring, fall and winter since these are sensitive seasons for most threatened and endangered species in the park. Alternative C may have a minor, long-term impact on the bull trout due to the increase of human disturbance at the outlet and along Lower McDonald Creek in spring, fall and winter. The effects of extending the season would be negative, minor to moderate and long-term.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of any threatened and endangered species as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions described in Chapter 3 Affected Environment would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse impacts during implementation due to construction noise and general disturbances to the area. The following threatened and endangered species would be temporarily affected: bald eagle, grizzly bear, gray wolf, Canada lynx, and bull trout.

Formalizing and hardening pedestrian pathways along the shoreline would reduce the amount of lakeside soil and vegetation available to filter sediments and pollutants in runoff from the surrounding developed area.

- Bald Eagle, Grizzly Bear. Because this alternative is not likely to alter human use, construction and maintenance activities at the Lake McDonald developed area, it would not result in any additional impacts on these species.
- Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Most use would be by individuals habituated to high levels of human activity. Therefore, no additional impacts to this species are expected.
- Canada Lynx. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den sites in the future. Neither alteration of vegetation within the developed area, nor changes in human activity patterns associated with construction during the winter, fall, or spring is expected to influence prey species population trends in

distribution, human access levels, or the range of lynx competitors and/or predators. Use by lynx during the summer is expected to continue at current levels with the continuation of normal maintenance and operation of the Lake McDonald Lodge and associated visitor services. Therefore, no adverse effects to lynx or their prey are expected as a result of this alternative.

- Bull Trout. Construction might increase localized runoff and have a minor long-term, adverse impact. Construction of new parking lots near Snyder Creek and new buildings could have minor localized, short-term, adverse impacts.

There would be no additional effects on sensitive species.

- **Alternative B.** Impacts described under alternative A also apply to this alternative.

Development proposed under this alternative is expected to have minor adverse impacts on the bald eagle, grizzly bear, gray wolf, and Canada lynx, due to the existing development in the area and the limited area that would be affected. Sediments and pollutants in increased water run-off from the expanded paved surface area would cause minor to moderate long-term, localized, adverse impacts on the bull trout.

Removing Boys' Dormitories 1 and 2 as well as the Johnson, Jammer and Hydro dormitories from Area I, and removing the existing Coffee Shop parking lot and Girls' Dormitories 1 and 2 from Area II would result in some revegetation. This action would have a negligible long-term, positive impact on threatened and endangered species given the small area affected and the proximity of adjacent development.

The new employee housing area proposed near the Coffee Shop would result in expanded human presence in the adjacent forested habitat; however, human presence and adjacent development have previously disturbed this area. As a result of the disturbed nature of the site, adverse impacts on and endangered species from new facilities would be minor. Short-term impacts associated with construction would be minor in all seasons, given the magnitude of the project. Parking lot and road improvement projects north of Snyder Creek would have minor long-term impacts due to loss of habitat. If construction is scheduled during spring, fall or winter, short-term impacts would be of minor to moderate intensity because these seasons are sensitive for most threatened and endangered species in the park.

Construction work during the early or late seasons could potentially have adverse impacts on wolverine. Additional development may result in a minor loss of habitat for boreal toads from clearing and loss of habitat for sensitive bird and bat species dependent on mature trees or snags from clearing and hazard tree removal. Minor adverse, long-term effects would occur. Removal of buildings in the riparian zone would result in a negligible improvement to habitat for several species.

Extending the operating season of the Lake McDonald Lodge, General Store, Coffee Shop, and other visitor accommodations five weeks (two weeks earlier and three weeks longer) would affect wildlife by displacing species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. Increased activity during this time could affect energy expenditure and productivity and increase mortality. The effects would be most pronounced on bald eagles roosting or feeding in the area, or grizzly bears traveling adjacent to the area. Overnight users may also impact other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor to moderate and long-term.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B remain the same under this alternative for threatened and endangered species and species of concern. Impacts to sensitive species would be the same as under alternative B.
- **Conclusion.** Alternatives A, B and C would have minor short-term, adverse impacts during implementation due to construction noise and general disturbances to the area to the grizzly bear, gray wolf, and Canada lynx. Extending the season would have negative, minor to moderate, long-term impacts.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of any threatened and endangered species as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions as described in Chapter 3 Affected Environment would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse impacts during implementation on the bald eagle, grizzly bear, gray wolf, and Canada lynx. The general maintenance proposed under this alternative would result in additional minor adverse impacts on threatened and endangered species unless activities are implemented during the current maintenance and operating season; then there would be no additional long-term effect on threatened and endangered or sensitive species.
 - **Bald Eagle.** Because no new development would occur under this alternative, direct loss of eagle habitat or removal of important habitat components such as foraging perches or screening vegetation would not occur due to management actions. Available habitat and opportunities for nesting, perching, foraging, and roosting in the St. Mary Valley would continue to be limited by development and associated use.
 - **Grizzly Bear.** Since no additional disturbance of forest or grassland habitats is proposed, there would be no additional effects on the grizzly bear. This alternative would not affect habitat, or change human-use patterns in or near areas that would likely be occupied by grizzly bears.
 - **Gray Wolf.** This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Most use would be by individuals habituated to high levels of human activity.
 - **Canada Lynx.** This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den sites in the future. Alteration of vegetation within the developed area, or changes in human activity patterns associated with construction during the winter, fall, or spring would not be expected to influence prey species population trends in distribution, human access levels, or the range of lynx competitors and/or predators. Use by lynx during the summer is expected to continue at current levels with the continuation of normal maintenance and operation of the Rising Sun developed area.
 - **Bull Trout.** This alternative would not affect known or potential bull trout habitat.

- **Alternative B.** Impacts described under alternative A also apply to this alternative. Constructing five new cabins with parking in Area I, as well as a new employee dormitory with parking and an outdoor recreation facility, would result in some loss of habitat, but the adverse impacts on threatened and endangered species would be minor and long-term, except during construction. Proposed construction activities would result in negligible short-term, adverse impacts in summer; and minor to moderate, short-term, adverse impacts in spring or fall. In winter, these activities would cause moderate short-term, adverse impacts on the bald eagle, grizzly bear, gray wolf and Canada lynx. Raising the berm and stabilizing the bank at the cabin circle would have negligible effects on known or potential bull trout habitat.

Construction work during the early or late seasons could potentially have adverse impacts on wolverine and golden eagles. The small loss of habitat could result in minor impacts on several bird and possibly bat species. Removal of the boat concession house could have a negligible, long-term impact on species using the riparian area or lake, although the dock and parking area would remain.

Extending the operating season of the visitor overnight accommodations, Coffee Shop and General Store/Motel/Dormitory five weeks (three weeks earlier and two weeks longer) would displace threatened, endangered and sensitive wildlife species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. Increased activity during this time could affect energy expenditure and productivity and increase mortality. Overnight visitors might also impact other nearby areas since the duration and time of their stay would be different than for day users. Wolves have been documented in the meadows adjacent to the developed area in association with the elk herd, and bald eagles roost and feed along the shoreline of St. Mary Lake. The effects would be negative, minor to moderate and long-term.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative with the following exceptions.

Constructing 10 new cabins and associated parking, and two new employee dormitories including an outdoor recreation facility in Area I would result in increased habitat loss, but the adverse impacts on threatened and endangered species would be continue to minor and long-term, except during construction. Proposed construction activities would result in negligible short-term, adverse impacts in summer; and minor to moderate, short-term, adverse impacts in spring or fall. In winter, these activities would cause moderate short-term, adverse impacts on the bald eagle, bull trout, grizzly bear, gray wolf and Canada lynx.

Impacts on sensitive species would be the same as under alternative B, but with slightly more habitat loss.

- **Conclusion.** Although alternatives B and C propose development, the overall area to be impacted would be two acres or less. All alternatives would have minor long-term, localized, adverse impacts on the bald eagle, grizzly bear, gray wolf and Canada lynx except during construction. Proposed construction activities would result in negligible short-term, adverse impacts in summer; minor to moderate, adverse, short-term impacts in spring or fall and moderate short-term impacts in the winter. There would be no effect or effects would be negligible on known or potential bull trout habitat. Extending the operating season would have negative, minor to moderate, long-term effects on threatened and endangered, and state listed species.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of threatened and endangered species as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions as described in Chapter 3 Affected Environment would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would result in minor to negligible, short-term, adverse impacts on these species during implementation. There would be no additional impacts on sensitive species.
 - Bald Eagle. No new development would occur under this alternative. Consequently, direct loss of eagle habitat or removal of important habitat components such as foraging perches or screening vegetation would not occur due to management actions. Available habitat and opportunities for nesting, perching, foraging, and roosting in the Two Medicine Valley would continue to be limited by development and associated use.
 - Grizzly Bear. Under this alternative, no additional disturbance of forest or grassland habitats is proposed; therefore, it would have no additional effects on the grizzly bear. This alternative would not affect grizzly bear habitat, nor change human-use patterns in or near areas that would likely be occupied by grizzly bears.
 - Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Most use would be by individuals habituated to high levels of human activity. Therefore, no additional impacts to this species are expected.
 - Canada Lynx. This alternative would not alter habitats or human use patterns in or near areas that could contain suitable habitat for lynx den sites. Neither alteration of vegetation within the developed area, nor changes in human activity patterns associated with construction during the winter, fall, or spring is expected to influence prey species population trends in distribution, human access levels, or the range of lynx competitors and/or predators. Use by lynx during the summer is expected to continue at current levels with the continuation of normal maintenance and operation of the Two Medicine developed area.
 - Bull Trout. There would be no effect, since there is no known population in this area.
- **Alternative B (Preferred).** Impacts described under alternative A also apply to this alternative. The overall impact on the bald eagle, grizzly bear, gray wolf, and Canada lynx would be minor to negligible, short-term and adverse due to the minor new construction of walkways and increased levels of human disturbance. There would be no effect on bull trout.

Construction work during the early or late seasons could have moderate to major, short-term, adverse impacts on wolverine, golden eagles and bighorn sheep, but the small amount of overall disturbance should result in negligible effects on other species.

Extending the operating season for the General Store four weeks (one week earlier and three weeks later) might displace some threatened, endangered and sensitive wildlife species adjacent to the store but the effects would be negligible, negative and long-term.

- **Conclusion.** Overall, alternatives A and B would have minor to negligible short-term, localized, adverse impacts on threatened and endangered species from repairs, improvements, minor construction and increased levels of human disturbance. Extending the operating season would have negligible, negative, long-term effects.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of threatened and endangered species as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions described in Chapter 3 Affected Environment would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor to negligible, short-term adverse impacts during construction on the following species: the bald eagle, grizzly bear, gray wolf, Canada lynx, and bull trout. There would be no additional effects on sensitive species.
 - Bald Eagle. This alternative would not affect bald eagle habitat, nor change human-use patterns in or near areas that would likely be occupied by bald eagles in the future.
 - Grizzly Bear. Under this alternative, no additional disturbance of forest or grassland habitats is proposed; therefore, it would have no additional effects on the grizzly bear. This alternative would not affect grizzly bear habitat, nor change human-use patterns in or near areas that would likely be occupied by grizzly bears.
 - Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Most use would be by individuals habituated to high levels of human activity. Therefore, no additional impacts to this species are expected.
 - Canada Lynx. This alternative would not alter habitats or human use patterns in or near areas that could contain suitable habitat for lynx den sites. Alternative A would not change the existing conditions associated with this species; therefore, additional impacts to the lynx are not anticipated.
 - Bull Trout. There would be no effects. Only one population is known to exist in the Many Glacier geographic area.
- **Alternative B.** Impacts described under alternative A also apply to this alternative. The small number of ground disturbance activities proposed under this alternative would occur in a relatively small area previously disturbed by human activities. The overall habitat area to be impacted by construction would be two acres or less. Proposed construction activities would result in negligible short-term, adverse impacts in summer, minor to moderate short-term, adverse impacts in spring/fall, and moderate to major short-term, adverse impacts in winter. Expanding the construction season would increase the intensity of associated impacts because it would greatly increase the level of human disturbance during the sensitive spring and fall seasons. There would be no effect on bull trout.

Construction work during the early or late seasons could have moderate to major, short-term, adverse impacts on wolverine, golden eagles and bighorn sheep. There would be negligible effect on other species because of the small loss of habitat and proximity to other development.

Extending the operating dates of the Many Glacier Hotel and other accommodations two weeks (one week earlier and one week later) would displace threatened, endangered and sensitive wildlife species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. Opening the hotel and related facilities requires staff to be present in the valley five to six weeks prior to opening. Increased activity during the extension could affect energy expenditure and productivity and increase mortality. The area is used extensively by grizzly bears in the spring and fall. Recent sightings have confirmed that wolves, wolverine, and Canada lynx also use the area in the spring and fall. The hotel and related buildings are in the middle of a travel corridor and winter range for bighorn sheep. The effects would be more pronounced because the operating dates for both the Many Glacier and Swiftcurrent facilities would be extended, since they are in the same valley. Overnight visitors might also affect wildlife in other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor to moderate and long-term.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative. While some increased development is proposed, the overall habitat area impacted by construction is two acres or less. Proposed construction activities would result in negligible short-term, adverse impacts in summer, minor to moderate short-term, adverse impacts in spring/fall, and moderate to major short-term, adverse impacts in winter. Expanding the construction season would increase the intensity of associated impacts because it would greatly increase the level of human disturbance during the sensitive spring and fall seasons.

Construction during the early or late seasons could have moderate to major short-term, adverse impacts on wolverine, golden eagles and bighorn sheep. There would be minor to moderate, long-term loss of habitat and obstruction of migration routes for bighorn sheep by additional dormitories on the hill above the hotel.

- **Conclusion.** Although alternatives B and C proposed development, the overall area to be impacted would be two acres or less. All alternatives would have minor long-term, localized, adverse impacts on the bald eagle, grizzly bear, gray wolf and Canada lynx except during construction. Proposed construction activities would result in negligible short-term, adverse impacts in summer; minor to moderate, short-term, adverse impacts in spring or fall and moderate to major, short-term impacts in the winter. There would be no effect on bull trout from any of the alternatives. Extending the operating dates would result in negative, minor, long-term and positive effects.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of threatened and endangered species as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Current conditions as described in Chapter 3 Affected Environment would be maintained under this alternative, and maintenance of existing visitor facilities would be ongoing. Improvements and repairs would have minor short-term, adverse

impacts on the bald eagle, grizzly bear, gray wolf and Canada lynx during construction. Given the proximity of the Swiftcurrent developed area to the Many Glacier developed area and the location of both in the same drainage system, existing conditions for threatened and endangered species in the Swiftcurrent Valley are the same as those described for alternative A at Many Glacier. There would be no additional effects on sensitive species.

- Bald Eagle. This alternative would not affect bald eagle habitat, nor change human-use patterns in or near areas that would likely be occupied by bald eagles in the future.
 - Grizzly Bear. Under this alternative, no additional disturbance of forest or grassland habitats is proposed; therefore, it would have no additional effects on the grizzly bear. This alternative would not affect grizzly bear habitat, nor change human-use patterns in or near areas that would likely be occupied by grizzly bears.
 - Gray Wolf. This alternative would not alter habitats or human use patterns in or near areas that could potentially serve as den or rendezvous sites in the future. Most use would be by individuals habituated to high levels of human activity. Therefore, no additional impacts to this species are expected.
 - Canada Lynx. This alternative would not alter habitats or human use patterns in or near areas that could contain suitable habitat for lynx den sites. Alternative A would not change the existing conditions associated with this species; therefore, additional impacts to the lynx are not anticipated.
 - Bull Trout. There would be no effect on this species.
- **Alternative B (Preferred)**. Impacts described under alternative A also apply to this alternative. The small number of ground disturbance activities proposed under this alternative would occur in a relatively small area previously disturbed by human activities. The overall habitat area impacted by construction is four acres or less. Proposed construction activities would result in negligible short-term, adverse impacts in summer, minor to moderate short-term, adverse impacts in spring/fall, and moderate to major short-term, adverse impacts in winter. Expanding the construction season would increase the intensity of associated impacts because it would greatly increase the level of human disturbance during the sensitive spring and fall seasons. There would be no effect on bull trout.

Construction work during the early or late seasons would have moderate to major, long-term, adverse impacts on wolverine, golden eagles and bighorn sheep. There would be a minor loss of habitat for other species, but the effects would be minimal because of the proximity to the rest of the development.

Extending the operating dates of the visitor accommodations and Restaurant/Store three weeks (two weeks earlier and one week later) would displace wildlife species from habitat within and adjacent to the developed area during the sensitive spring and fall seasons. Opening the inn and related facilities requires staff to be present in the valley five to six weeks prior to opening. Increased activity during this time could affect energy expenditure and productivity, and increase mortality. The area is used extensively by grizzly bears in the spring and fall. Recent sightings have confirmed that wolves, wolverine, and Canada lynx also use the area in the spring and fall. The inn and related buildings are in the middle of a travel corridor and winter range for bighorn sheep. Overnight visitors may also impact wildlife in other nearby areas since the duration and time of their stay would be different than for day users. The effects would be negative, minor to moderate and long-term.

- **Alternative C**. Applicable impacts described for alternatives A and B, including extending the operating season, remain the same under this alternative. While there this alternative proposes

some increased development, the overall habitat area impacted by construction is four acres or less. Proposed construction activities would result in negligible short-term, adverse impacts in summer, minor to moderate short-term, adverse impacts in spring/fall, and moderate to major short-term, adverse impacts in winter. Expanding the construction season would increase the intensity of associated impacts because it would greatly increase the level of human disturbance during the sensitive spring and fall seasons. There would be no effect on bull trout.

Impacts on sensitive species would be the same as under alternative B.

- **Conclusion.** Although alternatives B and C propose development, the overall area impacted is four acres or less. All alternatives would have minor long-term, localized, adverse impacts on the bald eagle, grizzly bear, gray wolf and Canada lynx except during construction. Proposed construction activities would result in negligible short-term, adverse impacts in summer; minor to moderate, short-term, adverse impacts in spring or fall and moderate short-term impacts in the winter. There would be no effect on bull trout. Extending operation dates would have negative, minor to moderate impacts.

There would be no significant adverse impacts on threatened and endangered species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of threatened and endangered species as a result of the implementation of any of the alternatives.

Wildlife Cumulative Impacts

During the history of Glacier National Park, development to accommodate visitors and steady growth in park visitation have affected threatened and endangered species through loss of habitat and disturbance from increasing human presence. Impacts on these species extend beyond physical boundaries because some species are less likely to use habitats near heavily used areas such as roads, trails, campgrounds and other developments.

In areas throughout and adjacent to the park, past actions such as development have affected threatened and endangered species. Present ongoing services within the park disturb these species' habitat in developed areas, along roads and trails, and near lakes and rivers. These services also contribute to habitat displacement. Reasonably foreseeable projects outside the park such as constructing additional employee housing, improving roads and bridges, and U.S. Forest Service timber salvaging and trail construction would have localized adverse impacts on threatened and endangered species. Future development projects inside the park, including the Going-to-the-Sun Road rehabilitation project that could cause loss of habitat in areas with little or no existing disturbance, would have moderate site-specific, adverse impacts on threatened and endangered species. The combined impacts of all actions both inside and outside the park, and any of the alternatives would have an overall minor to moderate, regional, long-term, adverse cumulative impact on any threatened and endangered species.

Plant Species

Methodology

Current vegetation conditions were assessed through consultation with the park's staff ecologist and biological technicians, synthesis of research reports and databases, and field surveys conducted during the summer of 2001. There are no known occurrences of federally listed threatened or endangered plant species in the park. The park likely holds suitable habitat for the federally listed water howellia (*Howellia aquatilis*), and may hold suitable habitat for the federally listed Spalding's catchfly (*Silene spaldingii*). Montana Natural Heritage Program databases and park research project reports were used to compile information used in this document. Refer to Tables 3.3 - 3.5.

A federal candidate species, the slender moonwort (*Botrychium lineare*) is found in the Many Glacier Valley. No plant species of concern have been identified in the Lake McDonald, Many Glacier, Swiftcurrent, Two Medicine or Rising Sun developed areas, or Granite Park, although additional field surveys would be conducted in summer of 2003.

Thresholds of impact are defined in Table 4.1.

- *Negligible*: The alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in U.S. Fish and Wildlife Service terms.
- *Minor*: The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. Minor effect would equate with a "may affect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.
- *Moderate*: An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some consequence to individuals, population, or habitat. Moderate effect would equate with a "may affect" in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely" or "not likely to adversely affect" the species.
- *Major*: An individual or population of a listed species, or its critical habitat, would be noticeably affected with a vital consequence to the individual, population, or habitat. Major effect would equate with a "may affect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species or critical habitat.
- *Short-term*: After implementation, would recover in less than 1 year.
- *Long-term*: After implementation, would take more than 1 year to recover.

Impact Analysis For Necessary and Appropriate Services Alternatives

For other necessary and appropriate activities, the limited sensitive plant surveys parkwide have not indicated direct or potential conflicts with the alternatives. In general, alternatives that limit group size (guided day hiking, alternative B) or reduce usage (horseback riding and horse packing services, alternatives B and D), pose the least threat to potentially impact sensitive plant species or habitat. Therefore, the analyses are similar to the consequences described for vegetation.

Apgar Village Developed Area

- **Alternative A – Status Quo/No Action.** There would be no impacts to plant species of concern.
- **Alternative B.** Impacts could be negligible to minor, negative and long-term on the velvet-leaved huckleberry and slender moonwort from construction of a bicycle path to the campground.
- **Alternative C.** Under alternative C, the construction of a new paved bicycle path around the southeast periphery of the Apgar Village developed area could potentially impact individual velvet-leaved blueberry plants; however, the exact route of the proposed bicycle path has not yet been finalized. Once a route is specified, mitigation measures, including a thorough survey of the proposed route for velvet-leaved blueberry, would reduce or eliminate the potential negative impact. If individual velvet-leaved blueberry plants were impacted, adverse effects would be negligible to minor, long-term.

Many Glacier Developed Area

- **Alternatives B and C** propose to provide an information/orientation pull-off on Many Glacier Road. A site along the road near Packer's East supports slender moonwort (*Botrychium lineare*), a federal candidate species, which is only found in the Many Glacier Valley. Detailed site plans for the pull-off have not yet been determined. Potential impacts will be assessed once detailed site plans are developed. Also, extending the operation dates of Many Glacier and Swiftcurrent would require early plowing of the Many Glacier Road. This could have a major, adverse, long-term effect on the slender moonwort.

Swiftcurrent Developed Area

- **Alternative B.** Plowing operations needed for earlier access could affect the slender moonwort plant population. The effects would be more pronounced by extending the operating dates for both the Many Glacier and Swiftcurrent facilities, since they are in the same valley.

Conclusion

Apgar Village alternatives B and C could have minor long-term, site-specific, adverse impacts if individual velvet-leaved blueberry plants are impacted by the construction of a bicycle path.

The information/orientation pull-off along Many Glacier Road would be located to avoid adverse effects on plant species of concern. Sites surveys would be conducted during design. Early plowing could have a major negative, long-term effect.

There would be no significant adverse impacts on federally or state listed plant species whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of federally or state listed plant species as a result of the implementation of any of the alternatives.

Plant Cumulative Impacts

Special status plant species could be impacted by a variety of future projects. Reasonably foreseeable future projects outside the park such as roadwork and U.S. Forest Service timber salvage operations could cause disturbance or removal of individual federally or state-listed plants. Other planned

projects inside the park, including the Going-to-the-Sun Road rehabilitation project and the construction of the West Side Discovery Center, which could include removal of individual velvet-leaved blueberry plants, would introduce additional disturbance. The cumulative effect of all of these actions and any of the alternatives could cause minor long-term, adverse impacts.

NATURAL SOUNDS

Methodology

Sound levels in the park were assessed through field visits and consultation with Glacier National Park staff. Alternatives were evaluated based on current sound levels and information gathered from other environmental assessments and environmental impact statements, as well as current literature reviews.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Effects would not be perceptible.
- *Minor:* Effects would result in an increase in noise levels in localized areas.
- *Moderate:* Effects would result in a readily detectable, widespread introduction of noise.
- *Major:* Effects would result in an introduction of noise.
- *Short-term:* Would occur during implementation.
- *Long-term:* Would be permanent.

Impacts Common to All Alternatives

All alternatives involving construction and/or repair would introduce temporary but increased noise into the park; however, these actions would take place in developed areas where existing noise from traffic, concessioner operations and visitor services is common. Increased noise introduced during construction would be loudest near the point of generation and would decrease with distance from the source. Typical noises associated with construction activities would be caused by equipment such as

trucks, bulldozers, hand tools and other machinery, and by additional human activity in work areas. Various measures would be implemented to minimize construction-related noise, including equipping construction equipment with adequate mufflers and scheduling work activities to avoid early morning or night work near lodges, campgrounds and sensitive wildlife habitat. Impacts related to construction, demolition and maintenance activities would be minor, short-term, and negative during implementation.



Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet, Public Showers

- **Alternative A – Status Quo/No Action.** Minor long-term, adverse impacts would result from the recurring removal of waste from toilet facilities.

- **Alternative B (Preferred).** Increased noise associated with construction and maintenance activities under alternatives B and C for Granite Park Chalet and alternative B for public showers would cause short-term adverse impacts. Impacts from increased noise during construction would be localized and have an overall minor effect on natural sound.

Guided Day Hiking (Cultural/Natural/Recreational)

- **Alternative A – Status Quo/No Action.** Continuing to provide guided day hiking services would have no additional impact on natural sound.
- **Alternative B (Preferred).** Limiting group size and the number of trips per day on high-traffic trails would not dramatically change noise levels.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action.** Park tour and transportation boats do not operate at high speeds and produce significant noise. Under alternative A, current interpretive boat tours and transportation services would have no additional impact on natural sound.
- **Alternative B (Preferred).** Added tour boat services on Lake McDonald and Two Medicine would not dramatically increase noise in the Lower McDonald Creek and Two Medicine drainages.

Guided Interpretive Motor Vehicle Tours and Public Transportation

- **Alternatives A and B (Preferred).** Motor vehicle tours, shuttle services, taxi services and private vehicle shuttle services do not significantly affect the existing noise level from existing park traffic. Alternatives A and B would not impact current natural sound along park roads.

Horseback Riding and Horse Packing Services

- **Alternatives A – Status Quo/No Action (Preferred), B, C and D.** Horseback riding and horse packing services would continue to introduce noise from visitors, guides and stock in areas where natural sound is predominant. Guided horseback riding services, however, do not increase noise levels significantly above those that occur from private horse use. Alternatives A, B, C and D would all have negligible negative impacts on natural sound.

Guided Bicycle Tours

- **Alternatives A and B (Preferred).** Guided bicycle tours would be restricted to roads and bicycle paths within the visitor services zone of all management areas with the exception of the North Fork area, and in the rustic zone of the Apgar Lookout, the 1913 Ranger Station and the Cut Bank area. Currently, there is noise associated with vehicle traffic in all of these areas, but guided bicycle tours would not have any effect on natural sound.

Conclusion

The Granite Park Chalet and public showers action alternatives would cause overall minor short-term, localized, adverse impacts from increased noise associated with construction.

Guided day hiking services, boat tours and transportation (boat taxi), guided interpretive motor vehicle tours and transportation, and guided bicycle tours would have no new effect on natural sound.

Alternatives A, B, C and D for horseback riding and horse packing services would all have negligible long-term, localized, negative impacts.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Apgar Developed Area

- **Alternative A – Status Quo/No Action.** Increased noise associated with construction and maintenance activities would cause adverse, short-term impacts. Impacts from increased noise during construction would be localized and have an overall minor effect on natural sound.
- **Alternative B.** Impacts described in alternative A also apply to this alternative. Extending the operating season of the Village Inn eight weeks (three weeks earlier and five weeks later) could affect natural sound by encouraging more visitor use during the early and late seasons at Apgar. The result could be additional noise from vehicles and other activities than currently exists during these times. The effects would be negative, minor and long-term.
- **Alternative C.** Impacts for alternatives A and B, including extending the operating season, remain the same for this alternative.

Conclusion. All alternatives would have minor adverse, short-term impacts from construction and maintenance. In addition, alternatives B and C would have minor negative, long-term effects on natural sound from increased visitor use due to an extended operating season.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Increased noise associated with construction and maintenance activities would cause short-term adverse impacts. Impacts from increased noise during construction would be localized and have an overall minor effect on natural sound.
- **Alternative B.** Extending the operating season of the Lake McDonald Lodge, General Store, Coffee Shop and other visitor accommodations five weeks (two weeks earlier and three weeks longer) would effect natural sound by increasing human activities such as vehicle use and other actions associated with running and operating the facilities. The effects would be negative, minor and long-term.
- **Alternative C.** Impacts for alternative B remain the same for this alternative.

Conclusion. All alternatives would have minor adverse, short-term impacts from construction and maintenance. In addition, alternatives B and C would have minor negative, long-term effects from increased activity due to an extended operating season.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Increased noise associated with construction and maintenance activities would cause short-term adverse impacts. Impacts from increased noise during construction would be localized and have an overall minor, negative effect on natural sound.
- **Alternative B.** Extending the operating season of the visitor overnight accommodations, Coffee Shop and General Store/Motel/Dormitory five weeks (three weeks earlier and two weeks longer) would affect natural sound by increasing activities and related noise from traffic and operation of the facilities. The effects would be negative, minor and long-term.
- **Alternative C.** Impacts for alternative B remain the same for this alternative.

Conclusion. All alternatives would have minor adverse, short-term impacts from construction and maintenance. In addition, alternatives B and C would have minor negative, long-term effects from an increased activity due to an extended operating season.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative A – Status Quo/No Action.** Increased noise associated with construction and maintenance activities would cause short-term adverse impacts. Impacts from increased noise during construction would be localized and have an overall minor, negative effect on natural sound.
- **Alternative B.** Extending the operating season for the General Store four weeks (one week earlier and three weeks later) would have negligible, negative, long-term impacts from a slight increase in use of the area.
- **Conclusion.** All alternatives would have minor adverse, short-term impacts from construction and maintenance. In addition, alternatives B and C would have minor negative, long-term effects from a slight increase in use due to an extended operating season.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Increased noise associated with construction and maintenance activities would cause short-term adverse impacts. Impacts from increased noise during construction would be localized and have an overall minor, adverse effect on natural sound.
- **Alternative B.** Extending the operating dates of the Many Glacier Hotel and other accommodations two weeks (one week earlier and one week later) would affect natural sound by increasing activities and related noise from traffic and operation of the facilities. The effects would be more pronounced from extending the operating dates for both the Many Glacier facilities and Swiftcurrent facilities, since they are in the same valley. The effects would be negative, minor and long-term.
- **Alternative C.** Impacts for alternative B remain the same for this alternative.

Conclusion. All alternatives would have minor adverse, short-term impacts from construction and maintenance. In addition, alternatives B and C would have minor negative, long-term effects from increased activity due to an extended operating season.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Increased noise associated with construction and maintenance activities would cause short-term adverse impacts. Impacts from increased noise during construction would be localized and have an overall minor, negative effect on natural sound.
- **Alternative B.** Extending the operating dates of the visitor accommodations and Restaurant/Store three weeks (two weeks earlier and one week later) would affect natural sound by increasing activities and related noise from traffic and operation of the facilities. The effects would be more pronounced if the operating seasons for both the Many Glacier facilities and Swiftcurrent facilities were extended, since they are in the same valley. The effects would be negative, minor and long-term.
- **Alternative C.** Impacts for alternative B remain the same for this alternative.

Conclusion. All alternatives would have minor adverse, short-term impacts from construction and maintenance. In addition, alternatives B and C would have minor negative, long-term effects from increased activity due to an extended operating season.

There would be no significant adverse impacts on natural sound whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of natural sound as a result of the implementation of any of the alternatives.

Cumulative Impacts

Existing noise from vehicle traffic and developed areas would continue to affect natural sound inside and outside of the park. Reasonably foreseeable future projects outside the park would have local effects on natural sound, but would not create a cumulative impact in combination with projects inside the park. Reasonably foreseeable future projects inside the park, including the Going-to-the-Sun Road rehabilitation, combined with the commercial services alternatives would result in minor to moderate short-term, negative impacts on natural sound from the additive impact of multiple, simultaneous noise sources.

AIR QUALITY

Methodology

Current air quality conditions were assessed through consultation with Glacier National Park staff and U.S. Environmental Protection Agency reports. Alternatives were evaluated based on current air quality and information gathered from other environmental assessment and environmental impact statement documents as well as current literature reviews.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Changes in air quality would not be measurable.
- *Minor:* Effects would result in a measurable change in air quality, although the changes would be small and the impacts would be localized.
- *Moderate:* Effects on air quality would be readily measurable and widespread.
- *Major:* Effects would be readily measurable on a regional scale, and air quality standards could be exceeded.
- *Short-term:* Would occur during implementation.
- *Long-term:* Would be continual or permanent.

Impacts Common to All Alternatives

Alternatives that involve construction, rehabilitation and maintenance would experience traffic and activity from truck and equipment that would increase dispersed dust and exhaust emissions during implementation. Adverse impacts



on air quality would be minor to negligible, short-term and localized. Dust abatement measures would be implemented to minimize air-borne particulates.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet, Public Showers and Developed Areas

- **Alternatives B (Preferred) and C.** A temporary increase in exhaust emissions and particulate dust from construction and maintenance work under alternatives B and C for Granite Park Chalet, alternative B for public showers and the alternatives for the developed area would result in a negligible short-term, localized, adverse impact on air quality.

Constructing new parking lots or expanding existing ones in the developed areas would not significantly increase the amount of vehicle emissions in any given developed area, and adverse impacts would be negligible. Constructing and operating new guest and employee facilities in the developed areas would not impact air quality because new facilities would generate negligible emissions.

Firewood Sales

- **Alternative A – Status Quo/No Action.** There would be no new effects or change in air quality from existing conditions.
- **Alternatives B (Preferred) and C.** The anticipated increase in availability and use could result in minor, short-term, adverse effects on air quality in the park from increased firewood use.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action.** Under alternative A, because tour boats generate negligible air pollutants, their emissions would continue to have negligible adverse impacts on air quality.
- **Alternative B (Preferred).** Added tour boat services on Lake McDonald and Two Medicine Lake would not dramatically increase emissions under alternative B, which would have negligible adverse impacts.

Guided Interpretive Motor Vehicle Tours and Public Transportation

- **Alternative A – Status Quo/No Action.** Assuming that motor vehicle tours, shuttle services and taxi services reduce the overall number of vehicles on park roads, continuing them under alternative A would continue to have a minor positive impact on air quality from reduced vehicle emissions.
- **Alternative B (Preferred).** Because expanding these services and providing shuttle services to transport private vehicles under alternative B would have a negligible influence on the number of vehicles currently on park roads, impacts would also be minor and positive.

Horseback Riding and Horse Packing Services

- **Alternatives A – Status Quo/No Action (Preferred), C and D** would have no impact on air quality.

- **Alternative B.** Under alternative B, no new facilities for expanded horseback riding or horse packing services in the Two Medicine and St. Mary areas would be built inside the park. All stock would be maintained outside the park from where they would be transported each day that services would be provided. This stock transport would negligibly increase in emissions from vehicles and would cause negligible adverse impacts on air quality.

Conclusion

Alternatives B and C for Granite Park Chalet, alternative B for public showers and alternatives for the developed areas would result in a negligible short-term, localized, adverse impact due to a temporary increase in exhaust emissions and particulate dust during construction.

Because constructing new parking lots in the developed areas would not significantly increase the amount of vehicle emissions in any given developed area, long-term adverse impacts on air quality would be negligible. Constructing and operating new guest and employee facilities in the developed areas would not impact air quality.

Under alternative A, emissions from tour boats would continue to have negligible long-term, localized, adverse impacts on air quality. These impacts would be the same under alternative B.

Assuming that guided motor vehicle tours and public transportation reduce the overall number of vehicles on park roads, alternatives A and B for these services would have minor long-term, widespread, positive impacts on air quality from reduced vehicle emissions.

Under alternative B for guided horseback riding and horse packing services, transporting stock to and from the park would result in a negligible long-term, localized, adverse impact on air quality. Alternatives A, C and D would not impact air quality.

There would be no significant adverse impacts on air quality whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of air quality as a result of the implementation of any of the alternatives.

Cumulative Impacts

Potential impacts from any alternatives combined with: dust generation and exhaust emissions from road and bridge improvement, and construction projects outside the park; Going-to-the-Sun Road rehabilitation work; and facility improvements or construction inside the park would have a negligible short-term, adverse impact on regional air quality. No long-term cumulative impacts would be expected as a result of implementing any of the alternatives combined with other projects outside the park; however, fueling the red buses with propane would have a minor long-term, positive cumulative impact on air quality inside the park. No cumulative impacts would exceed applicable regional air quality standards.

CULTURAL RESOURCES HISTORIC, ARCHAEOLOGICAL AND ETHNOGRAPHIC

Methodology

In this *Draft CSP and Draft EIS*, impacts on cultural resources are described below in terms of type, context, duration and intensity, which are consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). These impact analyses are not intended to entirely fulfill the requirements of Section 106 of the National Historic Preservation Act (NHPA). A Section 106 review would occur before any undertaking is implemented.

Under the Advisory Council on Historic Preservation's regulations implementing Section 106 of the NHPA (36 CFR Part 800), findings of either *no adverse effect* or *adverse effect* must also be made for undertakings affecting National Register of Historic Places listed or eligible cultural resources. An *adverse effect* occurs when an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the national register (e.g. diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of *no adverse effect* means there is an effect, but it would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the national register.

The regulations of the Advisory Council on Historic Preservation specify documentation standards to enable reviewers to understand the basis for findings of effect. There is more detail in these standards than in this EIS. For example, the effect of a rehabilitation project on a historic building cannot be evaluated until construction documents are available. The park will comply with the procedures outlined in 36 CFR Part 800 during the project planning phases.

CEQ regulations and the National Park Service's Conservation Planning, Environmental Impact Analysis and Decision-Making (Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resulting reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced.

Thresholds of impact for the purposes of this *Draft CSP and Draft EIS* are defined in Table 4.1.

Archaeological and Ethnographic Resources

- *Negligible*: Impact would be at the lowest level of detection — barely measurable with no perceptible consequences. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- *Minor*: Disturbance of a site(s) would be confined to a small area with little, if any, loss of important information potential. For purposes of Section 106, the determination of effect would be *no adverse effect*.



- *Moderate:* Disturbance of the site(s) would not result in a substantial loss of important information potential. For purposes of Section 106, the determination of effect would be *no adverse effect* or *adverse effect*.
- *Major:* Disturbance of the site(s) would be substantial and would result in the loss of most or all of the site and its potential to yield important information. For purposes of Section 106, the determination of effect would be an *adverse effect*.
- *Short-term:* Would occur only during implementation.
- *Long-term:* Would be continual or permanent.

Historic Resources

- *Negligible:* Impact(s) would be at the lowest level of detection — barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- *Minor:* Impact would alter a character defining feature(s) of a historic resource, but the work would be in accordance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- *Moderate:* Impact would alter a character defining feature(s) of the historic resource, diminishing the integrity of the resource, but still maintaining its eligibility for the national register. For purposes of Section 106, the determination of effect would be *adverse effect*.
- *Major:* Impact would alter a character defining feature(s) of a national historic landmark, diminishing the integrity of the resource to the extent that its designation is threatened. For purposes of Section 106, the determination of effect would be *adverse effect*.
- *Short-term:* Would occur only during implementation
- *Long-term:* Would be permanent

Impacts Common to All Alternatives

One of the purposes of the commercial services plan is to guide the general rehabilitation of historic concession facilities in the park. Consequently, rehabilitation of historic concession facilities under any of the alternatives would inevitably impact historic resources. Exact impacts on historic resources would depend on specific site and facility design plans, which would be developed in accordance with Section 106, the Secretary's Standards, and in consultation with the Montana State Historic Preservation Officer.

Both short-term and long-term impacts on historic resources would occur. Short-term impacts would include temporary changes to the historic setting of a historic district or to a historic building due to the presence of construction equipment and materials, or actual temporary changes to buildings during rehabilitation work. Such short-term impacts would be minor to moderate and adverse. Long-term impacts could be both positive and negative. Moderate to major long-term, positive impacts on historic

resources would result from the rehabilitation of deteriorating historic facilities. Long-term adverse impacts would only occur when no practical alternative is available. Potential long-term, adverse impacts would depend on specific design, but could include the introduction of non-historic materials into a facility, changing the historic design of a facility, altering the size, scale, or placement of a historic feature, or replacing a historic feature with a modern structure. Specific long-term, adverse impacts on historic buildings are not discussed in this EIS because none are anticipated (with the potential exception of the Lake McDonald Coffee Shop). The park intends to follow *The Secretary of the Interior's Standards for the Treatment of Historic Properties* when planning specific projects affecting historic properties.

Archaeological surveys have been conducted within and around the developed areas. Although a few sites have been found within the developed areas, no known sites would be affected by any of the alternatives. All new ground-disturbing activities would be monitored by an archaeologist, and if archaeological material is located, work would be stopped immediately at the affected area, and Section 106 procedures would be implemented.

The alternatives would not likely affect ethnographic resources in the park. The Blackfeet and the Confederated Salish and Kootenai Tribes have not raised concerns over projects in the park's developed areas in the past. Likewise, the tribes have not raised concerns over other services and guided activities that would occur throughout the park. However, Glacier National Park recognizes that the tribes hold a body of knowledge that may result in the identification of ethnographic resources in developed or other park areas in the future. The tribes have been notified of this project through the scoping process and Glacier National Park will invite comments on this EIS. Further consultation will occur in accordance with federal legislation and regulations and National Park Service policy, if ethnographic resources are identified in the future.

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action.** This alternative would maintain current conditions at Granite Park Chalet, and there would be no new impacts on the Granite Park Chalet and Dormitory National Historic Landmark or historic district.
- **Alternatives B (Preferred) and C.** Construction activities under alternatives B and C would have minor short-term, adverse impacts on the historic resources.
- **Conclusion.** Alternative A would have no impact. Alternatives B and C would have minor short-term, adverse impacts on historic resources during construction.

There would be no significant adverse impacts on historic resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of historic resources as a result of the implementation of any of the alternatives.

Apgar Village Developed Area

No buildings or structures in the Apgar Village developed area are listed in the National Register of Historic Places. The Apgar Village School House, a privately owned gift store, and the Permit Office may be eligible for the national register; however, these buildings would not be affected by any of the alternatives.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** Upgrading the historic buildings in the Lake McDonald developed area to comply with life safety, accessibility, and building codes would have both positive and negative impacts from rehabilitation of historic resources as described above for all alternatives.
- **Alternative B.** Impacts described for alternative A also apply to this alternative.

In addition, the Going-to-the-Sun Road National Historic Landmark and the Lake McDonald Lodge Historic District meet where the main entrance road intersects the Going-to-the-Sun Road. Modifying the main entrance road and reconfiguring parking on the promenade would have short-term adverse impacts on the historic district and national landmark during construction; however, long-term impacts would depend on final project design.

Constructing new parking lots in Areas I and II, a new laundry and maintenance facility in Area I, and a new employee housing village in Area II would add new development to the historic district. The new employee housing village would be designed to be architecturally compatible with the historic district. Long-term impacts on historic resources could be moderate to major and adverse.

Converting historic buildings from employee facilities to guest accommodations would be undertaken with minimal changes to the buildings' defining characteristics. This action should have no significant long-term, adverse impact on historic resources.

Impacts on historic resources from modifying the exterior of the Coffee Shop are unknown at this time. The park must prepare a Determination of Eligibility to determine if the Coffee Shop is eligible for the National Register of Historic Places. If it is determined to be eligible, this action would have a moderate, adverse impact on the Lake McDonald Lodge Historic District.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B also apply to this alternative with the following exceptions.

If the Coffee Shop were determined eligible for the national register (as described above), demolishing it would have a moderate, adverse impact on the Lake McDonald Lodge Historic District.

- **Conclusion.** Alternatives A, B and C would all have moderate to major long-term, site-specific positive impacts from rehabilitating deteriorating historic resources. Alternatives B and C could also have moderate long-term, site-specific, adverse impacts from adding new development to the Lake McDonald Lodge Historic District. Specific long-term impacts would depend on final project design plans.

There would be no significant adverse impacts on historic resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to

the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of historic resources as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative A – Status Quo/No Action.** Upgrading the historic buildings in the Rising Sun developed area to comply with life safety, accessibility, and building codes would have both positive and negative impacts from rehabilitation of historic resources as described under impacts common to all alternatives.
- **Alternative B.** Impacts described for alternative A also apply to this alternative.

Additionally, constructing new guest cabins on the Upper Loop would add new buildings to the Rising Sun Historic District; however, the new cabins would be designed to closely match the historic cabin design and fill in areas where cabins once existed. This action should have no significant long-term, adverse impact on historic resources.

The construction of a new employee dormitory with parking and an outdoor recreation facility near the Lower Motel would occur outside of the historic district and should have no significant adverse impact on historic resources.

Rehabilitation of the General Store/Motel/Dormitory and Coffee Shop building would be undertaken with minimal changes to the building's defining characteristics. This should have no significant long-term, adverse impact on historic resources.

- **Alternative C (Preferred).** Impacts from alternative A also apply to this alternative. Although alternative C would construct more new guest cabins and an additional employee dormitory than would alternative B, impacts on historic resources would generally be the same for alternatives B and C. In addition, the rehabilitation of some historic buildings for new functions under alternative C would be designed with minimal changes to the buildings' defining characteristics, and no significant long-term, adverse impacts on historic resources would be expected.
- **Conclusion.** Alternatives A, B and C would all have negligible to minor, long-term, site-specific positive impacts from rehabilitating deteriorating historic resources. Specific long-term impacts would depend on final project design plans.

There would be no significant adverse impacts on historic resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of historic resources as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative A – Status Quo/No Action.** Upgrading the historic buildings in the Two Medicine developed area to comply with life safety, accessibility, and building codes would have both positive and negative impacts from rehabilitating historic resources as described under impacts common to all alternatives. Modifying the existing comfort station to be compatible with the

area's historic architectural character would have a minor long-term, positive impact on historic resources.

- **Alternative B (Preferred).** This alternative would also have both positive and negative impacts from upgrading historic buildings to comply with life safety, accessibility, and building codes as described above for all alternatives. In addition, this alternative would have moderate positive impacts on historic resources. Removing the existing comfort station and constructing a new one that is compatible with the area's historic architectural character, as well as restoring the historic character of the General Store exterior and landscape would have minor long-term, positive impacts on historic resources.
- **Conclusion.** Alternatives A and B would have an overall minor, long-term, positive, site-specific impact on historic resources.

There would be no significant adverse impacts on historic resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of historic resources as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** Upgrading the historic buildings in the Many Glacier developed area to comply with life safety, accessibility, and building codes would have both positive and negative impacts from rehabilitation of historic resources as described above for all alternatives.
- **Alternative B.** Impacts described for alternative A also apply to this alternative.

In addition, restoring the designed historic landscape of the area surrounding the hotel, based on a Cultural Landscape Report, would result in a minor long-term, positive impact on the historic district. Because historic use of the area between Many Glacier Hotel and Swiftcurrent Lake has not been documented, it is unknown how the area was used and developed. Due to lack of information, it cannot be determined at this time what the impacts would be on the historic landscape and use of this area.

Impacts from developing a trail around Swiftcurrent Lake are unknown at this time. The park must prepare a Determination of Eligibility to determine if the trail is eligible for the National Register of Historic Places. If it is determined eligible, this action would have a negligible to minor, adverse impact on historic resources, depending on actual project design.

Reconstructing the stairway and additional historic features in the Many Glacier Hotel lobby would have a minor long-term, positive impact on historic resources.

- **Alternative C (Preferred).** Applicable impacts described for alternatives A and B also apply to this alternative with the following additions.

Constructing a new dormitory and outdoor recreational facility near the Upper Dormitory in Area II would add new development to the Many Glacier Hotel Historic District. The new dormitory

would be constructed at the edge of the historic district and would be designed to be architecturally compatible with it; however, long-term, adverse impacts on historic resources could be minor.

The conversion of the Lower Dormitory to guest lodging would be designed with minimal changes to the building's defining characteristics. This action should have a minor long-term, adverse impact on historic resources.

- **Conclusion.** Alternatives A, B and C would all have negligible to minor long-term, site-specific positive impacts from improving historic resources. In addition, alternative C could also have minor long-term, site-specific, adverse impacts from adding new development to the Many Glacier Hotel Historic District. Specific long-term impacts would depend on final project design plans.

There would be no significant adverse impacts on historic resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan (NPS 1999) or other relevant National Park Service planning documents. Consequently, there would be no impairment of historic resources as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** Upgrading the historic buildings in the Swiftcurrent developed area to comply with life safety, accessibility, and building codes would have both positive and negative impacts from rehabilitating historic resources as described above for all alternatives.
- **Alternative B (Preferred).** Impacts described for alternative A also apply to this alternative.

Removing cabin parking from the cabin rings and relocating parking along the loop road would alter the historic district somewhat, resulting in potential negligible to minor, positive impacts on historic resources.

Filling in the existing cabin rings with new guest cabins would result in no significant adverse impacts on the historic district. The new cabins would be designed to closely match the historic cabin design and fill in areas where cabins were once located. Constructing new cabin rings outside of, but adjacent to the historic district on the former Motel 4 site should have no adverse impact on historic resources. In addition, constructing a fourth motel in Area I should not impact historic resources because it is outside of the historic district.

- **Alternative C.** Applicable impacts described for alternatives A and B also apply to this alternative, with the following exception. Constructing a new employee dormitory in Area II outside of the historic district should not adversely impact historic resources.
- **Conclusion.** Alternatives A, B and C would all have negligible to minor, long-term, site-specific positive impacts from improving historic resources. In addition, some alterations to the historic district under alternatives B and C could have negligible to minor, long-term, site-specific, adverse impacts.

There would be no significant adverse impacts on historic resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of the park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's General Management Plan or other relevant National Park Service planning documents. Consequently, there would be no impairment of historic resources as a result of the implementation of any of the alternatives.

Cumulative Impacts

The Going-to-the-Sun rehabilitation project combined with the alternatives in the commercial services plan would have a moderate short-term, widespread, adverse cumulative impact on historic resources during construction, but a moderate to major widespread, positive cumulative impact on historic resources over the long term due to improvements of deteriorating historic buildings and structures. No cumulative impacts are anticipated for archaeological or ethnographic resources.

VISUAL RESOURCES

Methodology

Scenic/visual resources in the park were assessed through field visits and consultation with Glacier National Park staff. Alternatives were evaluated based on current views and information gathered from other environmental assessments and environmental impact statements.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Effects would not result in any perceptible changes to existing viewsheds.
- *Minor:* Effects would result in slightly detectable changes to a viewshed in a small area or would introduce a compatible human-made feature to an existing developed area.
- *Moderate:* Effects would be readily apparent and would change the character of visual resources in an area.
- *Major:* Effects would be highly noticeable or would change the character of visual resources by adding human-made features into a mostly undeveloped area or by removing most human-made features from a developed area.
- *Short-term:* Would be temporary during implementation
- *Long-term:* Would be permanent or continual

Impacts Common to All Alternatives

The presence of maintenance and construction equipment for all alternatives involving construction and/or repair would result in minor short-term, site-specific, adverse impacts on visual resources.



Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet, Public Showers and Boat Tours

- **Alternatives B (Preferred) and C** for Granite Park Chalet and **alternative B (Preferred)** for public showers would have minor short-term, adverse impacts due to the presence of construction equipment in the Granite Park Chalet area and the Apgar, Rising Sun, Two Medicine and Many Glacier campground areas during construction. Long-term adverse impacts in these areas would be negligible because new facilities would be placed in existing developed areas and would not result in any perceptible changes to visual resources. The extension of the dock would result in a minor long-term, adverse impact on visual resources.

Conclusion

Constructing new facilities under alternatives B and C for Granite Park Chalet and under alternative B under public showers would have overall negligible, long-term, site-specific, adverse impacts because new facilities would be placed in existing developed areas.

There would be no significant adverse impacts on visual resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the General Management Plan (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visual resources as a result of the implementation of any of the alternatives.

Impacts Common to All Alternatives in the Developed Areas

The presence of construction equipment in the Apgar Village, Lake McDonald, Rising Sun, Two Medicine, Many Glacier and Swiftcurrent developed areas during construction and maintenance under any of the alternatives would have short-term minor, adverse impacts on visual resources.

Constructing new guest and employee facilities or parking lots in any of the developed areas under any of the alternatives would result in minor to moderate changes to existing visual quality because the areas are already developed and contain existing human-made structures. All new facilities would be within existing developed areas and architecturally compatible with existing facilities there.

Depending on the size and location of new construction, adverse impacts in developed areas would be moderate to minor, long-term, and site-specific.

Apgar Village Developed Area

- **Alternative B (Preferred).** Constructing a new, smaller turnaround at the terminus of the Apgar Loop Road, creating a pedestrian green space in Area I along the lakeshore, and constructing new parking lots in Areas I and II to replace parking along Apgar Loop Road would divert traffic away from the lakeshore and open up the viewshed of Lake McDonald from the road. Visual resources would be improved from Apgar Village, and positive impacts would be moderate.
- **Alternative C.** Impacts described for alternative B also apply to this alternative. In addition, removing the Village Inn and converting the site to a pedestrian green space would open up the viewshed across Lake McDonald, resulting in a major positive impact.
- **Conclusion.** Alternative A for the Apgar Village developed area would have only minor short-term, site-specific, adverse impacts from the presence of maintenance and construction equipment.

Alternative B would have moderate long-term, positive, site-specific impacts, while alternative C would have overall long-term, major, positive, site-specific impacts from improving the viewshed of Lake McDonald.

Lake McDonald Developed Area

- **Alternative B.** Modifying the exterior of the Coffee Shop to make it more compatible with the historic district would result in a moderate positive impact on the visual quality of the Lake McDonald Lodge Historic District.
- **Alternative C (Preferred).** Demolishing the Coffee Shop and constructing a new restaurant would result in a major positive impact on the visual quality of the Lake McDonald Lodge Historic District because the new restaurant would be designed to complement the historic district, and its orientation would allow the historic green space north of the boulevard to be emphasized.
- **Conclusion.** Under alternative A for the Lake McDonald developed area, the presence of maintenance and construction equipment would cause only minor short-term, site-specific adverse impacts. Alternatives B and C would have both positive and negative impacts on visual resources: constructing facilities and parking lots would add new human-made features to the developed area, resulting in moderate long-term, site-specific, adverse impacts for both alternatives. However, alternative B would improve the visual quality of the historic district by modifying the exterior of the Coffee Shop, having moderate long-term, positive, site-specific impacts; constructing a new Coffee Shop under alternative C would have major long-term, positive, site-specific impacts.

Rising Sun Developed Area

- **Conclusion.** Alternative A for Rising Sun would have minor short-term, site-specific, adverse impacts only during construction and maintenance activities. Alternatives B and C (Preferred) would construct new facilities in the developed area, resulting in overall moderate, long-term, site-specific, adverse impacts.

Two Medicine Developed Area

- **Alternative B (Preferred).** Removing some of the parking from the lakefront would improve the viewshed of Two Medicine Lake, resulting in a moderate positive impact.

Removing the existing comfort station and constructing a new one at a new location in Area I, as well as restoring historic landscape features in front of the General Store, which is a National Historic Landmark, would improve its visual quality. The impacts on visual resources would be moderate and positive.

- **Conclusion.** Alternative A for Two Medicine would have negligible to minor short-term, site-specific, adverse impacts during construction and maintenance activities. Alternative B would improve the viewshed of Two Medicine Lake and the visual quality of the General Store National Historic Landmark. These actions would have a moderate long-term, positive, site-specific impact.

Many Glacier Developed Area

- **Alternatives B and C (Preferred).** Screening service structures and yards along the approach road in Area I and improving the landscape of the Many Glacier Hotel site with native trees, shrubs and wildflowers would improve the visual quality of the developed area. These actions would have a moderate positive impact.

- **Conclusion.** Under Alternative A for the Many Glacier developed area, the presence of maintenance and construction equipment would only cause minor short-term, site-specific adverse impacts. Alternatives B and C would have both positive and negative impacts. Under alternative B, constructing a new employee recreation facility at the edge of the developed area would cause minor long-term, site-specific, adverse impacts, while constructing a new employee housing and recreation facility under alternative C would cause moderate long-term, site-specific, adverse impacts. However, improving the cultural landscape of the area would have moderate long-term, positive, site-specific impacts on visual resources.

Swiftcurrent Developed Area

- **Conclusion.** Alternative A for the Swiftcurrent developed area would have minor short-term, site-specific, adverse impacts during construction and maintenance activities. Alternatives B and C would have overall moderate, long-term, site-specific, adverse impacts on visual resources from the construction of new guest and visitor facilities and parking in the developed area.

Cumulative Impacts

All of the impacts on visual resources from the alternatives discussed in the commercial services plan would be either short-term, or long-term but site-specific. There would not be any cumulative impacts on visual resources caused by projects outside of the park. Other reasonably foreseeable future projects inside the park, including the Going-to-the-Sun Road rehabilitation, and small-scale maintenance and construction projects throughout the park would have an overall minor, adverse cumulative impact on visual resources in the park.

REGIONAL AND LOCAL COMMUNITIES

Methodology

Local and regional communities are situated in the area defined as the three-county region of Flathead, Glacier and Lake Counties. Impacts on these local and regional communities were assessed using both qualitative and quantitative analyses of the alternatives. The analyses were made with respect to construction spending; employment during construction and on-going operation and maintenance; visitor spending; the addition of guest accommodations and employee housing; the extension of the operating season; and impacts of various concession operation enhancements.

Information was obtained through consultation with professional economists, park staff, the architectural and planning consultant for the Commercial Services Plan, and research of State of Montana and national studies. Specific methods for evaluating topical areas were used as appropriate and are described in the following discussion.



Thresholds of impact are defined in Table 4.1.

- *Negligible:* Effects would be below or at the level of detection. The effect would be slight.
- *Minor:* Effects would be detectable, but would be slight.

- *Moderate:* Effects would be readily apparent.
- *Major:* Effects would be readily apparent and would cause substantial changes to socioeconomic conditions in the region.
- *Short-term:* Would occur only during implementation (varies by site to a maximum of 10 years).
- *Long-term:* Would be continued beyond the duration of construction or would be permanent.

In comparison with other impact topics, socioeconomic impacts involve economic, employment and social concerns that affect not only individual sites within Glacier National Park, but also the surrounding local and regional areas. In particular, money spent and employment generated affect the general regional and local economy and should be examined on a larger scale as well as by each of the developed areas. For this reason, each impact was evaluated at the local and regional level for each alternative as well as for the combined set of actions.

Impacts Common to All Alternatives

Construction Spending and Employment

Construction spending consists of expenditures for design services, construction management, and labor and materials. Prior experiences with National Park Service facilities projects in Glacier National Park and Mesa Verde National Park were evaluated in order to estimate generalized project cost breakouts. Cost breakouts vary by project, depending on such factors as proximity to and availability of a construction employment force and materials, prevailing wages, building standards, delays and seasonal constraints. For the purpose of this study, it is assumed that project costs are divided as follows: architectural/engineering and construction management services (25%), labor (45%) and materials (35%). Project cost breakouts will be refined through more detailed cost estimating to be prepared later in the design process, and may differ from breakouts presented here.

Under alternatives for the six developed areas, construction funds would be spent on various components of design and construction in the three-county area, elsewhere in the state and out of the state. Based on the Many Glacier Hotel Stabilization Project, an ongoing project comparable to work proposed in the Commercial Services Plan, assumptions were made about the employment and funds spent in the local and regional economy compared to total employment and spending (pers. com. from Jason Casperson, DPS, to ARC, Oct. and Nov. 2002.) It is assumed that approximately 20% of the architectural/engineering and construction management services would be local and 80% would be out-of-state. Half of the construction workers would be local, while half would come from out-of-state. Out-of-state employees would spend 10% of their wages per diem in the area. It is assumed that nearly all construction firms and workers would come from the United States; consequently, Alberta or British Columbia, Canada would not be impacted. Virtually all of the materials would come through local and state vendors. An estimated 15% of the value of goods would be captured in the local and regional communities, including wages, overhead and profit, while the remaining 85% would be expected to pay for the materials imported from outside the region.

The following table summarizes the anticipated economic impacts of the investments by alternative.

**TABLE 4-3 ESTIMATED PROJECT COSTS AND
CONSTRUCTION-BASED LOCAL AND REGIONAL SPENDING BY ALTERNATIVE**

Locations	Alternative	Estimated Investment	Estimated Funds Spent in Local and Regional Communities
Necessary & Appropriate Services			
Granite Park Chalet			
	Alternative A	\$ -	\$ -
	Alternative B	\$ 1,650,000	\$ 374,000
	Alternative C	\$ 2,380,000	\$ 539,000
Public Showers (various locations)			
	Alternative A	\$ -	
	Alternative B	\$ 900,000	\$ 204,000
Developed Areas			
Apgar			
	Alternative A	\$ 481,000	\$ 109,000
	Alternative B	\$ 1,995,000	\$ 452,000
	Alternative C	\$ 7,082,000	\$ 1,603,000
Lake McDonald			
	Alternative A	\$ 6,372,000	\$ 1,443,000
	Alternative B	\$ 14,870,000	\$ 3,365,000
	Alternative C	\$ 28,595,000	\$ 6,470,000
Rising Sun			
	Alternative A	\$ 3,998,000	\$ 905,000
	Alternative B	\$ 7,233,000	\$ 1,637,000
	Alternative C	\$ 10,345,000	\$ 2,340,000
Two Medicine			
	Alternative A	\$ 858,000	\$ 194,000
	Alternative B	\$ 1,419,000	\$ 321,000
Many Glacier			
	Alternative A	\$ 24,194,000	\$ 5,474,000
	Alternative B	\$ 27,624,000	\$ 6,250,000
	Alternative C	\$ 37,037,000	\$ 8,380,000
Swiftcurrent			
	Alternative A	\$ 2,684,000	\$ 607,000
	Alternative B	\$ 9,521,000	\$ 2,154,000
	Alternative C	\$ 9,369,000	\$ 2,120,000

For purposes of this analysis, it is assumed that the Commercial Services Plan improvements could be implemented over a ten-year period of time. In the first three years, a higher level of construction-based activity is assumed to occur, during which 56% of total project funds would be expended. During the next seven years, the level of activity would taper off to completion of the plan. The schedule is assumed to be the same under all alternatives. It must be noted that this hypothetical schedule is subject to funding availability. Numerous variables could extend the time frame beyond ten years and lead to different sequences of high and low-activity years.

Investments that generate jobs provide a positive contribution to the regional and local economies. The relative significance of the contribution of construction-based spending to the local and regional communities can be approximately measured by comparing annual funds spent in the local and regional economies to the total annual wages in the three-county region. Total construction wages for general building in the three-county region were estimated at \$21.8 million in 2001 (Montana Dept. of Labor & Industry 2001a, 2001b, and 2002). The estimated contribution to the regional general building construction wages by the Commercial Services Plan alternatives would be between 4.1% to 10.0% per year during the highest three years over ten years of construction activities. In relation to the overall economy of Flathead, Glacier and Lake Counties, the capital investments for the plan would be fairly small. In 2001, the most recent year for which data is available, the annual wages paid for all industries in the three-county region exceeded \$1 billion (Montana Dept. of Labor & Industry 2001a, 2001b, and 2002). The range of total local spending for the plan is estimated to be between \$8.73 million and \$22.01 million over the construction period, and between \$896,000 and \$2,184,629 per year during the highest three years of construction activities. Construction-based spending for improvements described in the Commercial Services Plan would increase the three counties' total annual wages by between 0.08% to 0.20% during the three peak years of construction activities. Table 4-4 below shows the total wages paid in year 2001 in the region by county. Table 4-5 shows the estimated construction-based spending in local and regional communities in comparison to the three-county region's annual wages.

TABLE 4-4 TOTAL WAGES PAID IN LOCAL AND REGIONAL COMMUNITIES

	Annual Wages Paid 2001 for General Building Construction	Annual Wages Paid - 2001 for All Industries
Glacier	\$ 1,185,802	\$ 88,613,531
Lake	\$ 3,060,944	\$ 181,188,961
Flathead	\$ 17,567,111	\$ 811,970,021
Total	\$ 21,813,857	\$ 1,081,772,513

TABLE 4-5 ESTIMATED TOTAL LOCAL AND REGIONAL IMPACTS FROM CONSTRUCTION-BASED SPENDING

	Total Local & Regional Spending	Total Local & Regional Construction Wages	High Year Annual Local and Regional Construction Wages	Portion of Total Local & Regional Spending to Regional Total Wages - High Years	Portion of Local & Regional Construction Wages to Regional General Building Wages - High Years
Alternative A - Status Quo (Least Costly)	\$8,732,000	\$4,775,000	\$896,802	0.08%	4.11%
Preferred Alternatives	\$20,695,000	\$11,002,500	\$2,066,401	0.19%	9.47%
Combination of Most Costly Alternatives	\$22,011,000	\$11,632,000	\$2,184,629	0.20%	10.01%

Direct and Indirect Spending

Per capita retail sales vary considerably across counties, since residents of small communities often cross county lines to shop in larger towns and cities. It is estimated that “completely rural counties” in Montana – including Lake and Glacier Counties – capture 60% of their residents’ retail expenditures, indicating that 40% of their retail expenditures are spent outside the county of residence. On the other hand, “urbanized nonmetro counties” having at least 10,000 people living in urban places – including Flathead County – attract per capita sales estimated to be 15% greater than expenditures by their residents (U.S. Department of Agriculture 2000).

The indirect benefit — sometimes called the “multiplier effect” — of spending construction dollars in the local and regional economies for design, labor and materials consists of the recirculation of “new money” exported from outside the local and regional economies. The multiplier of direct to indirect spending depends on characteristics of the local and regional economies regarding the level of local “leakage” in buying goods and services supplied from outside the local and regional area (Ellard et al). The indirect benefits would likely contribute to the local and regional economies from 118% to 140% of the direct spending, based on the methodology used in the *Draft Going-to-the-Sun Rehabilitation Plan/Environmental Impact Statement* (NPS 2002). The indirect benefits accrued from the Commercial Services Plan construction activities would vary by county since smaller rural counties capture fewer retail expenditures than larger, more urban counties.

Visitation and Visitor Spending

The total number of visitors to Glacier National Park is projected to increase at a slow rate, amounting to approximately 2% total over a ten-year period and an average of 0.23% per year, as shown in Chapter 3 Affected Environment. Additionally, the increase in guest accommodations also would be minor.

Visitor spending would not increase measurably for any of the alternatives, although it is likely that park visitors and hotel guests would spend more money for commercial services due to enhancements to the developed areas and the modest increase in accommodations. Increased prices for lodging, food or any other services could result in some additional spending.

It should also be noted that lack of investment in commercial services facilities and allowing the facilities to substantially degrade would result in minor to moderate, negative impacts on visitation and visitor spending. Commercial services facilities improvements would avert a decline in visitation and visitor spending that could result from neglect or lower service levels.

Concessioner operations could be impacted during construction and rehabilitation, potentially causing a short-term decline in visitation and visitor spending. If construction occurs during the visitor season, impacts on concessioner operations could be minor to moderate, adverse and short-term. If construction occurs during the off-season, concessioner operations would not be impacted. The construction and rehabilitation of guest units and conversion of employee housing to guest units would be coordinated to minimize the loss of guest rooms at any one time, eliminating short-term impacts on concessioner operations. However, construction and rehabilitation could cause an overall loss of guest rooms during any single visitor season, resulting in minor to moderate, negative, but short-term impacts on concessioner operations. Depending on location, if these impacts occur, a negligible to minor, short-term decrease in visitor spending could also occur.

Addition of Guest Accommodations

The total number of guest rooms available in the park would not increase substantially under the alternatives, growing from 512 to a target maximum of 540 rooms. The impacts on accommodations vary by alternative. During the highest visitation period of the tourist season, when there are no lodging vacancies, the addition of 28 guest rooms would likely add to the total number of guests staying in the park. During periods when lodging occupancy is low, additional capacity might not result in additional overnight stays in the park. Table 4-6 below shows the number of guest rooms by alternatives.

TABLE 4-6 GUEST ACCOMMODATIONS (ROOMS)

Facility Area	Existing/ Alternative A	Alternative B	Alternative C	Preferred Alternatives
Apgar	36	Approx. 36	Approx. 36	Approx. 36
Lake McDonald	100	Approx. 90 - 100	Approx. 110 - 120	Approx. 110 - 120
Rising Sun	72	Approx. 75 - 80	Approx. 75 - 80	Approx. 75 - 80
Two Medicine	0	0	0	0
Many Glacier	216	Approx. 210 - 220	Approx. 230 - 240	Approx. 230 - 240
Swiftcurrent	88	Approx. 75 - 80	Approx. 85 - 95	Approx. 75 - 80
Total	512	486 - 516	536 - 571 ¹	540 ¹
Net Change from Existing	No Change	26 Fewer to 4 Additional Rooms	24 to 28 Additional Rooms	14 to 28 Additional Rooms ¹

¹ The National Park Service has set a park-wide maximum of 540 guest rooms, not including the backcountry chalets and private lodging. Consequently, the net change under the preferred alternative is limited to no more than 28 additional rooms. See Appendix 4, Comparative Site Alternatives Analysis Supplemental Information.

A 4% State Lodging Facility Use Tax, commonly called the “bed tax,” is collected on all lodging accommodations. Additional bed tax revenues would result from occupancy of the added guest rooms and generate more advertising funding for local chambers of commerce and other regional non-profit tourism corporations. In turn, enhanced advertising would likely increase visitation to the area, having a negligible to minor, long-term positive impact on visitor spending in local and regional communities.

Addition of Employee Housing Accommodations

The impacts on employee housing accommodations vary by alternative, as shown in Table 4-7 below.

TABLE 4-7 EMPLOYEE HOUSING (BEDS)

Facility Area	Alternative A — Status Quo/No Action	Alternative B	Alternative C	Preferred Alternatives
Apgar ¹	Approx. 2	Approx. 2	Approx. 2	Approx. 2
Lake McDonald Area	Approx. 169	Approx. 166	Approx. 181	Approx. 181
Rising Sun	Approx. 61	Approx. 72	Approx. 85	Approx. 85
Two Medicine	Approx. 14	Approx. 14	Approx. 14	Approx. 14
Many Glacier	Approx. 223	Approx. 223	Approx. 243	Approx. 243 ²
Swiftcurrent	Approx. 55	Up to 120	Up to 118	Up to 120 ²
Granite Park Chalet	Approx. 2	Approx. 2	Approx. 8	Approx. 2
Sperry Chalet	Approx. 8	N/A	N/A	N/A
Total	Approx. 534	Approx. 599	Approx. 651	605 - 607
Net Change from Existing	No Change	Approx. 65	Approx. 117	Approx. 121

¹ Housing for approximately 8 horse concession employees is provided outside the Apgar Village at the stables.

² If Many Glacier employee housing were reduced to offset the gain of new employee housing at Swiftcurrent then the net gain would be smaller than the range presented.

See Appendix 4, Comparative Site Alternatives Analysis Supplemental Information.

Maintaining and enhancing the employee facilities would provide a greater number of beds and more desirable living arrangements for employees. This improvement would allow concessioners to retain a diverse, qualified staff, resulting in an overall minor, positive long-term impact. Currently, some employees live in nearby communities and must drive considerable distances. The current primary concessioner hires approximately 25 local employees who live outside the park, amounting to roughly 4% of their total work force in Glacier National Park. The substantial distance from employee pools has affected the concessioner's ability to recruit and retain sufficient locally hired employees at many of the developed areas in the past. Consequently, the expanded concessioner housing provided under the alternatives may further affect the concessioner's incentive to hire locally. However, given the limited number of employees affected and the park's policy of encouraging concessioners to recruit and hire from local communities (including Blackfeet and Confederated Salish and Kootenai Tribe members), the alternatives would have negligible, negative, short-term impacts on local and regional communities.

Extension of Operating Season

Extending the operating season of various lodge facilities and associated accommodations would allow visitors increased opportunities to stay in Glacier National Park and increase revenues and employment opportunities, resulting in minor increases in visitor and employee spending that would result in a positive, long-term benefit for the local and regional economies. In addition, the longer operating season would shorten the off-season when many of the maintenance and new construction activities occur, resulting in negligible negative, long-term impacts. The operating season of individual facilities might require temporary seasonal adjustments to avoid interfering with necessary maintenance and construction projects.

Impact Analysis for Necessary and Appropriate Services Alternatives

Expanding commercial services would increase employment opportunities, resulting in negligible to minor, positive long-term impacts on regional and local communities.

Alternatives that would develop new business opportunities include: private vehicle shuttle service, motorcycle tours, and guided underwater diving. Alternatives that would enhance existing services include: expanding boat tours and transportation on Lake McDonald and Two Medicine Lake, and expanding guided horseback riding in the Two Medicine and St. Mary areas. Providing firewood sales in campgrounds and additional public showers would increase revenue opportunities. These new business opportunities and enhanced services might increase visitation and visitor spending, resulting in negligible long-term, positive impacts on local and regional communities.

New interpretive services that would provide increased revenue opportunities include step-on guide services, guided underwater diving and guided motorcycle tours. Increased opportunities would also be provided by enhancing these existing services: guided interpretive vehicle tours, guided bicycle tours, natural history and cultural day hiking opportunities, and the proposed doubling of the current day hiking use level. Increases in opportunities for interpretive services would result in negligible to minor, positive, long-term impacts on local and regional economies.

Improvements to Granite Park Chalet and the development of additional public showers both entail construction activities resulting in positive, short-term impacts on regional and local communities. A total of \$374,000 would be spent locally and regionally on the construction of Granite Park Chalet improvements under alternative B, resulting a negligible positive, short-term impact. A total of \$539,000 would be spent locally and regionally on the construction of Granite Park Chalet

improvements under alternative C, resulting a negligible positive, short-term impact on regional or local communities. Similarly, \$204,000 would be spent locally and regionally on the construction of public showers improvements under alternative B, resulting a negligible positive, short-term impact on regional or local communities.

Conclusion

The alternatives for expanding commercial services would result in negligible to minor, positive long-term impacts on regional and local communities from increased revenue opportunities, associated employment, and increased visitation and visitor spending. Those alternatives that require construction activities (i.e., Granite Park Chalet and additional public showers) would also result in negligible positive, short-term impacts on regional and local communities from spending and employment generated.

Apgar Developed Area

- **Alternative A – Status Quo/No Action.** An estimated total of \$109,000 would be spent locally and regionally on improvements to the Apgar developed area and have a negligible positive, short-term impact on regional or local communities because the proposed spending level is relatively low.
- **Alternative B (Preferred).** A total of \$452,000 would be spent locally and regionally on the Apgar developed area, and would result in a negligible positive, short-term impact on regional or local communities because the proposed spending level is relatively low.

Extending the operation season of the Village Inn by eight weeks could result in negligible to minor, positive long-term benefits from increased revenue opportunities for all the concessioners, although it might increase shoulder season competition with businesses outside the park.

- **Alternative C.** A total of \$1,603,000 in spending locally and regionally would have a minor positive, short-term impact on regional or local communities because the proposed spending level is more substantial. Extending the operation season would have the same impacts as under alternative B.
- **Conclusion.** None of the alternatives would change the numbers of guest accommodations and employee housing capacity at the Apgar developed area; however, extending the season under alternatives A and B would have a positive, long-term impact from increased revenue opportunities. Construction-based investments would impact the regional and local communities because some of the investment amounts would be spent in the region. While the impacts from alternatives A and B on the local economy are negligible, impacts from the higher spending level in alternative C would have a minor, positive impact.

Lake McDonald Developed Area

- **Alternative A – Status Quo/No Action.** A total of \$1,443,000 would be spent locally and regionally on improvements to the Lake McDonald developed area, resulting in a minor positive, short-term impact on regional or local communities because the proposed spending level is relatively low.
- **Alternative B.** A total of \$3,365,000 would be spent locally and regionally, having a minor positive, short-term, impact on the regional and local economy.

Extending the operation season of the Lake McDonald Lodge, General Store, food services, and other visitor accommodations five weeks could result in negligible to minor, positive long-term benefits from increased revenue opportunities for all concessioners, although the extended season might increase shoulder season competition with businesses outside the park.

- **Alternative C (Preferred).** The slight increase in guest and employee accommodations would have minor positive, long-term impacts on the local and regional economy. A total of \$6,470,000 would be spent locally and regionally. Construction-based expenditures would have a minor positive, short-term impact on the regional and local economy. Extending the operating season would have the same impacts as under alternative B.
- **Conclusion.** Alternative B would have a negligible negative, long-term impact on the regional and local economy from reducing guest accommodations by 0 to 10 rooms, resulting in reduced visitor spending. Alternative C would have a negligible positive, long-term impact by adding 10-20 guest rooms. Both alternatives would have a negligible to minor, positive, long-term impact from an extended season. All alternatives would have a minor positive, short-term impact on the regional and local economies.

Rising Sun Developed Area

- **Alternative A – Status Quo/ No Action.** A total of \$905,000 would be spent locally and regionally on improvements to the Rising Sun Developed Area. Construction-based spending would have a negligible positive, short-term impact on regional or local communities because the proposed spending level is relatively low.
- **Alternative B.** The addition of 11 employee housing beds would have a negligible positive, long-term impact on local and regional communities. A total of \$1,637,000 would be spent locally and regionally. This construction project would have a minor positive, short-term impact on the regional and local economy.

Extending the operating season of the Rising Sun Motor Inn, Coffee Shop, and General Store/Motel/Dormitory five weeks could result in negligible to minor, positive, long-term benefits from increased revenue opportunities for all concessioners, although the extended season might increase shoulder season competition with businesses outside the park.

- **Alternative C (Preferred).** The addition of 3-8 guest rooms and 24 employee housing beds would have a negligible positive, long-term impact on local and regional communities. A total of \$2,340,000 would be spent locally and regionally. This spending would have a minor positive, short-term impact on the regional and local economy. Extending the operating season would have the same impacts as under alternative B.
- **Conclusion.** Alternatives B and C would have negligible positive, long-term impacts on the regional and local economies from changes to guest accommodations, and negligible to minor positive, long-term impacts from extending the operating season. Alternative C would have a minor positive, long-term impact from the increase in employee housing. All alternatives would have a positive, short-term impact on the regional and local economy from construction activity, varying in magnitude from negligible to minor.

Two Medicine Developed Area

- **Alternative A – Status Quo / No Action.** A total of \$194,000 would be spent locally and regionally on the Two Medicine developed area. The construction-based spending would have a negligible positive, short-term impact on regional or local communities because the proposed spending level is relatively low.
- **Alternative B (Preferred).** A total of \$321,000 would be spent locally and regionally on the Two Medicine developed area. The expenditures under Alternative B would have a negligible positive, short-term impact on regional or local communities from construction activity.

Extending the operating season for the General Store four weeks could provide a negligible positive, long-term benefit due to increased revenue opportunities for all concessioners, although the extended season might increase shoulder season competition with businesses in East Glacier.

- **Conclusion.** Both alternatives would entail negligible positive, short-term and long-term impacts on the regional and local communities from construction-based spending, and extended operating seasons. Alternative B would also have a negligible positive, long-term benefit from extending the operating season.

Many Glacier Developed Area

- **Alternative A – Status Quo/No Action.** A total of \$5,474,000 would be spent locally and regionally on improvements to the Many Glacier developed area. The construction-based expenditures would have a minor positive impact on regional and local communities.
- **Alternative B.** The increase of 4 to 14 guest rooms would result in a negligible positive, long-term impact. A total of \$6,250,000 would be spent locally and regionally on the Many Glacier developed area. Spending under this alternative would have a minor, positive impact on regional or local community economies.

Extending the operating season of the Many Glacier Hotel and other accommodations two weeks could result in negligible, positive long-term benefits from increased revenue opportunities for all concessioners, although the extended season might increase shoulder season competition with businesses outside the park and the Blackfoot Indian Reservation.

- **Alternative C (Preferred).** Adding 14 to 24 guest rooms would result in a minor positive, long-term impact. An increase of as many as 20 employee beds and improvements in employee living conditions would have a minor positive, long-term impact. An estimated \$8,380,000 would be spent on construction at the Many Glacier developed area, having a minor, positive impact on the local and regional economies. Extending the operating season would have the same impacts as under alternative B.
- **Conclusion.** Alternatives B and C add guest accommodations to the Many Glacier developed area, having a negligible to minor, positive impact on local and regional economies from the increase in visitor spending. Extending the operating season would have negligible positive, long-term benefits. Construction-based spending under all alternatives would have a minor positive, short-term impact on the regional and local economy.

Swiftcurrent Developed Area

- **Alternative A – Status Quo/No Action.** A total of \$607,000 would be spent locally and regionally on the Swiftcurrent developed area. These expenditures would have a negligible positive, short-term impact on regional or local communities.
- **Alternative B (Preferred).** Employee housing would increase by up to 65 additional beds, entailing a minor positive, long-term impact. A total of \$2,154,000 would be spent locally and regionally within the Swiftcurrent developed area. The spending would have a minor positive, short-term impact on regional or local communities.

Extending the operating season of the visitor accommodations and Restaurant/Store three weeks could result in negligible positive, long-term benefits from increased revenue opportunities for all concessioners, although the extended season might increase shoulder season competition with businesses outside the park and the Blackfeet Indian Reservation.

- **Alternative C.** Up to 63 additional employee housing beds would result from improvements, having a minor positive, long-term impact. A total of \$2,120,000 would be spent locally and regionally on the Swiftcurrent developed area. Spending under alternative C would have a minor positive, short-term impact on the local and regional economies. Extending the operating season would have the same impacts as under alternative B.
- **Conclusion.** Both alternatives B and C would have a minor positive, long-term impact on local and regional economies from increased spending in the area. Construction-based spending under these alternatives would have minor positive, short-term impacts, while alternative A would have a negligible positive, short-term impact on the regional and local economy. Extending the season would have negligible positive, long-term benefits.

Summary Conclusion

Between 14 and 28 additional guest rooms would be added under alternative C and the preferred alternative for all developed areas. The added number of rooms represents a range increase in lodging capacity of 2.7% to 5.4%. For all developed areas combined, the impact from increased lodging is negligible and positive. However, impacts for the alternatives vary among sites, from negligible to minor and positive, and all impacts would be long-term.

The employee housing capacity could increase by a range of 65 to 121 beds, or as much as 22% over the existing number of beds. However, it is possible that the employee housing needs for Many Glacier and Swiftcurrent could be significantly reduced by the combination of alternatives selected for those two areas.

All of the preferred alternatives would result in a moderate positive, long-term impact from enhancing the quality, safety and capacity of employee housing. This improvement would allow concessioners to retain a diverse, qualified staff allowing for the extension of the operating season and resulting in a minor positive, long-term impact on local and regional communities. While improved employee housing might affect the concessioners' incentive to hire locally, this would affect a small number of prospective employees, based on the size of the local workforce currently working for concessioners in the park. To offset this potential negative impact, concessioners are encouraged to recruit and hire locally, including Blackfeet and Confederated Salish and Kootanai Tribe members.

The extension of the developed areas' operating seasons would result in positive, long-term impacts on revenues and employment opportunities; although shortening the off-season when much of the maintenance and construction work occurs could result in a negligible negative, long-term impact on local and regional communities.

Estimated construction-based spending in regional and local communities would be in the range of \$8.7 million to \$22.0 million, depending on the alternative selected for each site. Including both direct and indirect spending, a range of \$9.9 million to \$30.8 million would be spent in the regional and local communities. An increase in construction spending and employment during the implementation of the alternatives would have a minor positive, short-term impact on regional and local communities. A potential increase in wages of the regional and local general building construction workforce by 4.1% to 10.0% would be significant during the peak construction period. However, the peak construction period would be expected to last about three years, diminishing over the remaining years of the plan's implementation. The modest magnitude of construction-based spending in the regional local economy relative to the size of the surrounding communities indicates that impacts on the overall economy would likely be negligible. Direct construction-based spending would amount to a range of 0.08% to 0.20% of the total regional wages during the three peak years of construction.

Expanding commercial services could increase employment opportunities and cause negligible to minor positive, long-term impacts. If construction and rehabilitation work takes place during the visitor season, minor to moderate adverse, short-term impacts on concessioner operations would occur. If concessioner operations are adversely affected and a decrease in guest rooms occurs during any single visitor season, a negligible to minor, short-term impact to regional and local economies would result from a decrease in visitor spending.

Overall, it is not anticipated that the Commercial Services Plan would have a significant impact on visitor spending, although the opportunity for higher spending levels per visitor would be enhanced through the commercial services improvements. The short-term, positive impacts created by construction work and the long-term preservation of visitor use facilities together prevent any negative long-term impact on the local and regional communities. Otherwise, if the Commercial Services Plan were not implemented, a negative impact could result from neglect and lower levels of service.

Cumulative Impacts

Cumulative impacts are anticipated from the Commercial Services Plan in combination with the anticipated Going-to-the-Sun Road Rehabilitation project, the continuing Many Glacier Hotel renovation and the expected continuation in strong regional construction activities associated with population growth in the three-county region. A regionwide increase in construction spending and employment associated with other construction projects would have a moderate positive, short-term impact on regional and local communities. The local construction workforce might be expanded in the short-term, or alternately, additional workers from outside local and regional communities might take advantage of job opportunities from these additive projects.

THE BLACKFEET AND THE CONFEDERATED SALISH AND KOOTENAI TRIBES

Methodology

Impacts on the Blackfeet Nation and Confederated Salish and Kootenai Tribes were qualitatively assessed based on information obtained through consultation with park staff.

Thresholds of impact are defined in Table 4.1.

- *Negligible*: Effects from changes would be below or at the level of detection.
- *Minor*: Effects would be detectable but changes in employment rates or cultural impacts would be slight.
- *Moderate*: Effects would cause an apparent change in employment rates or would have apparent cultural impacts.
- *Major*: Effects would have an important impact on employment rates or park resources that have religious or cultural significance to the Blackfoot or Confederated Salish and Kootenai Tribes.
- *Short-term*: Would occur during construction
- *Long-term*: Would be continual or permanent

Impact Analysis For Necessary and Appropriate Services Alternatives

All Services and Developed Areas

None of the alternatives would be expected to have any adverse socioeconomic impacts on the Blackfoot and the Confederated Salish and Kootenai Tribes (Salish and Kootenai). The alternatives are not expected to alter the current level of recruiting and hiring of members of the Blackfoot and the Salish and Kootenai for concessioner- and construction-related employment in the developed areas. Service and guided activity alternatives that propose to add additional operators or concessioners, however, could have a positive socioeconomic impact on the Blackfoot, and the Salish and Kootenai by creating more employment opportunities. Although additional operator and concessioner contracts would not be offered or awarded solely to the Blackfoot or the Salish and Kootenai, opportunities to bid on and receive contracts and additional employment opportunities for the tribal members would be created.

Additionally, it is anticipated that the alternatives would have no impact on park resources that have religious or cultural significance to the Blackfoot or the Salish and Kootenai.

Conclusion

None of the alternatives would be expected to have any adverse socioeconomic or cultural impacts on the Blackfoot or the Confederated Salish and Kootenai Tribes of the Flathead Reservation. Service and guided activity alternatives that propose to add operators or concessioners would create additional contract or employment opportunities and could have moderate long-term, positive impacts on the Blackfoot and the Confederated Salish and Kootenai Tribes.

Cumulative Impacts

No cumulative impacts are anticipated.

VISITOR USE AND EXPERIENCE

Methodology

Impacts on visitor use and experience were assessed using data and information obtained through consultation with park staff and the architectural and planning consultant for the Commercial Services Plan. Information gathered from park files, review comments by park staff, and other environmental assessments and environmental impact statements was also used in the analysis.



Thresholds of impact are defined in Table 4.1.

- *Negligible:* Changes in visitor use and/or experience would be below or at the level of detection. The visitor would not likely be aware of the impacts.
- *Minor:* Changes in visitor use and/or experience would be detectable, although the changes would be slight.
- *Moderate:* Changes in visitor use and/or experience would be apparent.
- *Major:* Changes in visitor use and/or experience would be readily apparent and would have important consequences.
- *Short-term:* Would occur during implementation
- *Long-term:* Would be continual or permanent

Impacts Common to All Action Alternatives

Operating seasons. Extending the operating seasons for the developed areas would provide visitor services earlier and later than has been typical during the past few years. For visitors, there will be more days available for visits during the early and late seasons. These extended seasons provide opportunities to visit key areas of the park without crowds and in cool weather, and to experience late spring and early fall in the high country. The result is a minor positive, long-term benefit for visitors who are free of school schedules.

Impacts from construction. All alternatives involving construction or rehabilitation would result in short-term, site-specific, adverse impacts on visitors if work occurs during the visitor season. Increased noise, the presence of construction equipment and potential temporary closure of some guest accommodations or services during construction would have minor site-specific, adverse, short-term impacts on visitor use and experience.

Impact Analysis For Necessary and Appropriate Services Alternatives

Alternative A – Status Quo/No Action. Alternative A for the services discussed below would have no new effects on visitor use and experience.

Action Alternatives

Granite Park Chalet: Alternative B (preferred) would have minor positive, long-term impacts from improved restroom facilities, availability of potable water in the chalet and consequent improved

sanitation levels for food preparation and hygiene. Alternative C would have the same impact as alternative B, but would have a longer negative impact from major construction.

Guided Day Hiking: Alternative B (preferred) limits the size of guided hiking groups both in day use and backcountry zones. The effect on visitors would be minor, positive and long-term by providing trails in better condition, and opportunities to experience the wilderness of the park with fewer hikers. This alternative would also enable visitors to be in closer proximity to guides giving interpretive talks.

Guided Underwater Diving Tours: Alternative B (preferred) would add the new educational benefit of studying underwater lake environments, enabling visitors to appreciate the rich variety of ecosystems in Glacier National Park. The result would be a negligible to moderate, positive, and long-term effect.

Firewood Sales: Alternative B (preferred) would increase the availability of firewood, enabling visitors to be comfortable in the cool evenings and erratic weather that are part of the experience in northern parks. It would also provide more opportunities for visitors to use fire pits and fireplaces, enhancing the experience of the park's rustic setting. These actions would have a negligible, positive, long-term impact. However, experiencing the pristine park environment could be affected by smoke from additional fires, having a minor negative, short-term effect for some visitors.

Public Showers: The effects of **alternative B (preferred)** would be moderate positive, and long-term for visitors who camp or stay in the cabins at Swiftcurrent by providing easy access to showers and improved sanitation at campgrounds. Overall, because more visitors use hotel or motel accommodations, the effect would be negligible, site-specific and long-term.

Boat Tours and Transportation (Boat Taxi): In **alternative B (preferred)**, the effect would be minor positive, and long-term for visitors seeking the historic boat trip experience to Lake McDonald Lodge; with its historic views and cultural resource education. Shuttle trips between Apgar and the lodge for shopping or dining would also have a negligible positive, long-term effect.

Guided Interpretive Motor Vehicle Tours and Public Transportation: These services would continue to affect visitation in a negligible, positive, and long-term manner. In alternative B, providing new services for vehicle drop-off and pick-up, allowing visitors to unload gear and leave their vehicles in security while touring, riding or hiking would have a minor positive, long-term effect. For sightseers who use the parking lots, freeing valuable parking spaces at popular destination locations under this alternative would provide a moderate positive, long-term benefit.

Horseback riding and horse packing services: The effect of **alternative A (preferred)** on visitors seeking a western horse experience would be negligible positive, long-term. For other visitors, the continued occurrence of flies, waste on trails and odors in developed areas would have moderate negative, short-term effects.

Guided bicycle tours: Under **alternative B (preferred)**, the bicyclists, particularly first-time riders, would experience less crowding and safer riding conditions, resulting in minor, positive, and long-term impacts. For motoring visitors, safer lane traffic and shorter waits on uphill road sections would result in negligible positive, and long-term impacts during the occasional encounter with cycling groups.

Commercial step-on guide services: In **alternative B**, skilled guides for bus and private vehicle tours in the park would personalize the visitor experience, resulting in minor positive, and long-term impacts. Seniors, foreign visitors, and persons with disabilities would benefit from the flexibility and convenience of this service.

Guided motorcycle tours: Under **alternative B**, this new visitor service would affect a small portion of the park's total visitation pool. The inclusion of educational guides would have a moderate positive, long-term benefit for motorcycling visitors. For other visitors, additional noise and occasional encounters with motorcycle traffic would result in minor negative, long-term impacts.

Conclusion

Construction would cause some minor short-term, adverse impacts during implementation. Except for horseback riding / packing, all preferred alternatives would have an overall minor, positive, long-term effect on visitor use and experience. Guided day hiking, bicycling, motorcycle, and commercial step-on tours would have a parkwide impact along transportation corridors, while impacts from the remaining services would be local or random. Alternative A for horseback riding / packing would have both positive and negative effects.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Alternative A – Status Quo/No Action for all developed areas: For all the developed areas discussed below, visitors would continue to benefit from continued services maintained under alternative A. In addition, this alternative would include changes to facilities to resolve needed building life/safety and code compliance issues. Besides minor to moderate, negative, short-term impacts because of inconvenience and noise, these construction projects would impose few constraints on visitors since the work would be scheduled over more than ten years and would affect only a few sites during any one year. Impacts under alternative A also apply to the other alternatives.

Action Alternatives

Apgar Developed Area

- **Alternative B (Preferred).** For visitors staying in Apgar Village, improving Village Inn room privacy, separating pedestrians and traffic, expanding opportunities for bicycling, and creating an enhanced lakeshore experience for pedestrians would result in moderate, positive, long-term effects. Extending the operating season of the Village Inn eight weeks (three weeks earlier and five weeks later) would result in increased opportunities for visitors to stay overnight. Day use visitors might experience increased activity and noise, less wildlife and some degradation of resources. There would be moderate positive and negative, long-term effects. For visitors who briefly sightsee in Apgar, the impact would be negligible.
- **Alternative C.** Increased pedestrian/bicycling opportunities, modern accommodations, and a dramatic sense of entry to the lakeshore and mountain views in this gateway community for the park would create a major positive, and long-term impact. The impact on visitors who anticipate lakeshore room accommodations with a view, this alternative's effect would be major negative, and long-term. Impacts from expanding the operating season in alternative B also apply to this alternative.

- **Conclusion.** Alternative A has only a negligible, positive, long-term effect on visitors since proposed actions are enhancements rather than a change to the Apgar experience. The alternative B (preferred) effect is more moderate long-term, and positive since actions provide lodging privacy, create better pedestrian / traffic separation, expand the opportunities for cycling.

Alternative C expands this effect by radically changing the village experience. A visitor whether first-time or returning would experience a markedly different lakeshore and lodging experience.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Lake McDonald Developed Area

- **Alternative B.** Making services more readily available and reducing pedestrian/traffic congestion would have positive impacts. Extending the operating season of Lake McDonald Lodge, the General Store, and other visitor accommodations by five weeks (two weeks earlier and three weeks longer) would allow visitors to stay overnight and utilize the commercial facilities. The extended season would help offset the minor reduction in accommodations. The effects of these actions would be positive, minor to moderate and long-term. Current off-season visitors might be affected by an increase in traffic, noise and activity from current levels. There could be less wildlife and some possible increase in resource degradation. For these visitors, there would be a negative moderate, and long-term affect.
- **Alternative C (Preferred).** Adding a boat trip from Apgar to Lake McDonald would allow visitors to enjoy a leisurely trip and experience the historical approach to the area. In addition, increasing accommodation options, visually unifying the site architecture, and improving traffic capacity and safety would benefit visitors. Effects would be major long-term, and positive on the general visitor experience. The impacts from extending the operating season under alternative B also apply to this alternative.
- **Conclusion.** Much of the construction under all alternatives could be scheduled during the non-peak and closed months, resulting in a negligible, adverse, short-term impact on the early or late season visitor experience. However, the extensive building program under alternative C would entail limited food services and dormitory work. Alternative B, and to a greater extent alternative C (preferred), would enhance the historic setting, allow for greater comfort amenities, and return the site area to day and overnight use by guests only. The effect of these actions would be major, positive, and long-term.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Rising Sun Developed Area

- **Alternative B.** Extending the operating season of the Coffee Shop and General Store/Motel/Dormitory and visitor overnight accommodations five weeks (three weeks earlier and two weeks longer) would also increase the opportunities for visitors to stay in the Rising Sun area and utilize the facilities. Visitors might experience an increase in noise, traffic and activity from current levels. There would be less wildlife and some possible increase in resource degradation. In addition, this alternative would add cabins and expand shopping, public showers, and self-service laundry services. Impacts would be positive and negative, moderate and long-term.
- **Alternative C (Preferred).** Changing the current mixture of motel rooms and cabins combined with the separation of employee and visitor areas would result in higher room availability and a quieter experience with moderate long-term, and positive effects on visitors. Impacts from expanding the season under alternative B also apply to this alternative.
- **Conclusion.** Strategic scheduling under alternative A could result in negligible short-term, adverse impacts from construction. Other actions under this alternative would have minor long-term, positive impacts on the typical visitor. Alternative B would expand the services, resulting in moderate long-term, positive and negative impacts. Under alternative C, an increase in accommodations and quiet would have a moderate long-term, positive impact.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Two Medicine Developed Area

- **Alternative B (Preferred).** An enhanced lakeshore, historically appropriate architecture / site design, and safe connections to camping areas in this alternative would result in major positive, long-term impacts. Extending the operating season for the General Store four weeks (one week earlier and three weeks later) would provide extended services to visitors using the area. The affects would be positive, minor and long term.
- **Conclusion.** Strategic scheduling under alternative A could result in negligible negative, short-term impacts from construction. A similar impact during construction in alternative B would be expected. Visitors would be able to enjoy unencumbered natural views, lakeshore educational opportunities, and safe, accessible pathways between trails, campground, store, and lakefront activity areas. The effects on the visitor would be major, long-term, and positive.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Many Glacier Developed Area

- **Alternative B.** Extending the operating dates of the Many Glacier Hotel and other accommodations two weeks (one week earlier and one week later) would increase the opportunities for visitors to stay in the Many Glacier area and utilize the facilities. This extension, combined with opportunities to experience the most scenic views, learn about the area's history, and enjoy the original hotel lobby experience would have a positive, moderate and long-term effect. There could be some moderate negative, long-term effects with less wildlife and some possible increase in resource degradation due to an increases in noise, traffic and activity during extended season weeks.
- **Alternative C (Preferred).** Replicating additional hotel interior spaces and providing interpretive guides would enhance educational opportunities for visitors. Removing all employee activities from the hotel and the rehabilitated Lower Dormitory would increase room opportunities for guests and create a formal resort atmosphere, with separation between employees and visitors. Together, all of these actions would have major long-term, positive effects on the visitor experience. There would be some negative, moderate, and long-term affects on wildlife and possible increases in resource degradation due to additional noise, traffic and activity from new dormitory areas. The impacts under alternative B from extending the season would also apply to alternative C.
- **Conclusion.** Although alternative A would have localized, minor to moderate, adverse impacts during construction, the completed improvements would preserve the hotel's historic integrity and have a moderate positive, long-term, effect on the visitor experience. Impacts under alternative B would also have moderate positive, long-term impacts by further enhancing the character defining features of the area's cultural landscape and the hotel. Alternative C would have the greatest impact on visitor use by revitalizing additional historic elements of the hotel, adding guest accommodations and separating the employee area from guests. These actions would result in a major positive, long-term impact.

The action alternatives would have some negative, moderate, and long-term affects on wildlife, with possible increases in resource degradation due to additional noise, traffic and activity.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Swiftcurrent Developed Area

- **Alternative B (Preferred).** Emphasizing the historic cabin ring setting, providing safer walk paths, and lowering noise levels in guest areas in conjunction with new cabin-only guest accommodations would result in moderate negative, long-term impacts for some bus tour groups who prefer motel rooms with individual bathrooms or a block of rooms grouped together. In contrast, the availability of more 1930s-style cabins would provide many visitors with an historic, rustic experience and result in moderate positive, long-term impacts. Extending the operating dates of the Restaurant/Store and visitor accommodations three weeks (two weeks earlier and one week later) would increase the opportunities for visitors to stay in the Swiftcurrent area and utilize the

facilities. Visitors might experience an increase in noise, traffic and activity from current levels. There would be less wildlife and some possible increase in resource degradation. The effects would be positive and negative, moderate and long-term.

- **Alternative C.** Preserving the current mixture of motel rooms and cabins, adding new accommodations, and improving safety in cabin areas would result in a minor, long-term positive impact on visitor experiences. Impacts from extending the operating season in alternative B also apply to alternative C.
- **Conclusion.** Strategic scheduling under alternative A could result in negligible short-term, adverse effects from construction. Under alternative B, overall improvements would have a moderate positive, long-term effect on visitors by preserving the rustic experience of cabin rings and improving visitor safety. Other than adding rooms, alternative C would have less impact on the visitor experience, and impacts would therefore be minor long-term, and positive. With an extended season, there could be less wildlife and some possible increase in resource degradation. These effects could be negative, moderate and long-term for some early and late season visitors.

There would be no significant adverse impacts on visitor services or opportunities whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the *General Management Plan* (NPS 1999) or other relevant NPS planning documents. Consequently, there would be no impairment of visitor services as a result of the implementation of any of the alternatives.

Cumulative Impacts

Visitor services have changed over the years in response to the use of automobiles, a desire for educational opportunities, accessibility requirements, and the demand for camping options. Impacts on visitor experiences extend beyond the boundaries of the park where demand for dining, sales, and accommodations increases with cycles of visitation. However, with the park as the destination goal, the overall effect on the visitor experience outside the park would be minor, positive, and long-term as long as the quality of facilities in the park is maintained.

Continuing repairs and improvements to existing facilities, especially at Many Glacier and Lake McDonald, would further preserve the historic assets and affect future visitor experiences in a minor to moderate, long-term, positive manner. Planned improvements in all developed areas would resolve current building condition and code problems. Upgrading of sewer and water utilities at key locations would result in safer and more environmentally sensitive facilities, and improve visitor accommodations and services. Reasonably foreseeable projects for improving facilities would have localized impacts on the visitor experience, but a cumulatively moderate, positive, long-term effect. The combined impact of all actions both inside and outside the park for any of the alternatives would have a minor to moderate, positive, long-term, regional effect on visitor experience and use.



ENERGY CONSUMPTION

Methodology

Current energy sources and requirements were assessed through consultation with Glacier National Park staff. Assessments of potential impacts on energy consumption were based on comparison between existing conditions and anticipated future conditions associated with implementation of the alternatives.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Effects would be below or at the level of detection. The effect would be slight.
- *Minor:* The effects would be detectable, but impacts would be small and would not have an appreciable effect on parkwide energy consumption.

- *Moderate:* The effects would result in readily apparent and widespread changes in energy consumption.
- *Major:* The effects would be readily apparent and would cause substantial changes to energy requirements on a regional scale.
- *Short-term:* Would occur during implementation
- *Long-term:* Would be continual or permanent

Impact Analysis For Necessary and Appropriate Services Alternatives

Granite Park Chalet

- **Alternative A – Status Quo/No Action.** This alternative would have no new impact on energy consumption. Sanitary waste would continue to be flown out by helicopter, and propane would continue to be the available energy source.
- **Alternatives B (Preferred) and C.** Improving the sanitary system under the Preferred Alternative would allow sanitary waste treatment to occur on-site, and energy requirements to haul wastes by helicopter would be eliminated. Under alternative C, providing full service dining and lodging accommodations would result in a minor increase in non-grid energy consumption from the current level of use at the chalet. The proposed addition of a photovoltaic system to the chalet under alternatives B and C, however, would reduce propane use.

Boat Tours and Transportation (Boat Taxi)

- **Alternative A – Status Quo/No Action.** Current interpretive boat tours and transportation services would have no new impact on energy consumption.
- **Alternative B (Preferred).** Added tour boat services on Lake McDonald would result in a negligible increase in energy consumption.

Guided Interpretive Motor Vehicle Tours and Public Transportation

- **Alternative A – Status Quo/No Action.** Assuming that motor vehicle tours, and shuttle and taxi services reduce the overall number of vehicles on park roads, continuing to provide these services under alternative A would continue to reduce overall energy consumption by vehicles in the park.
- **Alternative B (Preferred).** Expanding these services and providing private vehicle shuttle services under alternative B would have a negligible influence on the amount of vehicles currently on park roads and would result in a negligible decrease in energy consumption.

Conclusion

Equipment and vehicles used for construction and maintenance under all alternatives would result in a negligible short-term increase in park-wide energy consumption.

Alternative A for Granite Park Chalet would have no new impact on energy consumption. Alternatives B and C would result in a minor, long-term decrease in energy consumption because sanitary waste would be treated on-site, and helicopters would no longer be required to haul sanitary waste from the chalet. Under alternative C, providing full service accommodations would result in a negligible, long-term increase in energy consumption.

Alternative A for tour boat and transportation services would have no new impact on energy consumption. Under alternative B, added services would have only a negligible, long-term increase on energy consumption.

Alternative A for interpretive motor vehicle tours and public transportation would continue to reduce overall energy consumption from vehicles. Under alternative B, expanded services would cause a negligible, long-term decrease in energy consumption.

All Developed Areas

Construction and maintenance activities: Equipment and vehicles used during the construction and repair of visitor service facilities would result in a negligible short-term increase in park wide energy consumption.

Long-term operation of developed areas: The operation of new guest and employee facilities in Lake McDonald, Rising Sun, Many Glacier and Swiftcurrent developed areas would result in a negligible increase in energy consumption. Energy-conserving technology would be incorporated in the design of new facilities. Improvements to existing facilities in the developed areas such as electrical upgrades and the replacement of older heating units, as well as the installation of new windows, would improve energy efficiency in some existing buildings. Overall, any increase in energy consumption from the developed area alternatives would be negligible.

Conclusion

Equipment and vehicles used for construction and maintenance under all alternatives would result in a negligible short-term increase in park-wide energy consumption.

Overall impacts from actions proposed in the Apgar Village, Lake McDonald, Rising Sun, Many Glacier and Swiftcurrent developed areas would result in a negligible, long-term, park wide increase in energy consumption.

There would be no significant adverse impacts on energy resources whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation of Glacier National Park; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the 1999 *General Management Plan* or other relevant NPS planning documents. Consequently, there would be no impairment of energy resources as a result of the implementation of any of the alternatives.

Cumulative Impacts

Reasonably foreseeable future projects outside of the park, including road and bridge improvement projects, as well as U.S. Forest Service timber salvage and resource rehabilitation projects, would result in short-term increases in energy consumption by construction equipment. Going-to-the-Sun Road rehabilitation work inside the park would also cause increased energy consumption during construction. Additive impacts from energy use for future projects outside and inside the park combined with any of the alternatives would result in a minor short-term, regional increase in energy consumption. No long-term cumulative impacts on energy resources are anticipated.

LANDOWNERS IN AND ADJACENT TO PARK BOUNDARIES

Methodology

Alternatives were evaluated on the basis of data and other information gathered from consultation with park staff, and from examining Geographic Information System (GIS) thematic layers (available through the park's GIS coordinator), and survey reports. There are no private lands in Two Medicine, Many Glacier, Swiftcurrent or Rising Sun. Therefore, no impact analyses of these areas were conducted.

Thresholds of impact are defined in Table 4.1.

- *Negligible:* Changes would be below or at the level of detection.
- *Minor:* Changes would be detectable, although the changes would be slight.
- *Moderate:* Changes would be apparent.
- *Major:* Changes would be readily apparent and would have important consequences.
- *Short-term:* Would occur during implementation
- *Long-term:* Would be permanent

Impact Common to All Alternatives

Temporary inconveniences to landowners, such as increased noise and congestion from construction vehicles and equipment might occur from nearby construction and rehabilitation activities; however, these adverse impacts would be short-term and minor. Disrupted quiet and decreased natural environment surrounding private lands due to potential increased development adjacent to private lands would cause minor to moderate long-term, adverse impacts.

Although the commercial services plan alternatives are not expected to significantly increase the total number of visitors to the park, improving the developed areas and providing additional visitor opportunities could attract more park visitors to developed areas or could increase the average amount

of time visitors spend in developed areas. A potential increase in visitors in the Apgar Village developed area could increase the commercial value of private property. Impacts from a potential increase in commercial value of private property would depend on the alternative but would be long-term and positive. The Apgar Village developed area contains private land that has been developed for residential and commercial uses, whereas the Lake McDonald developed area is primarily residential.

There would be no impacts on private lands from necessary and appropriate commercial services that occur outside the developed areas, such as guided hiking, backpacking and boat tours, etc.

Impact Analysis For Necessary and Appropriate Services Alternatives

Apgar Village Developed Area

- **Alternatives A – Status Quo/No Action, B (Preferred) and C** would have short-term adverse impacts during construction as described above for all alternatives. In addition, alternatives B and C could disrupt quiet and natural environment surrounding private lands as described above for all alternatives if new parking lots and/or lodging are constructed adjacent to private land. This would cause minor long-term, adverse impacts on private landowners. All alternatives would improve parking and circulation, which would have moderate positive, long-term impacts on landowners. Under alternative C, if the Village Inn is removed from the lakeside, the private land currently situated behind the Village Inn (southwest of the Village Inn) would become lakefront property. This action would significantly increase the commercial value of this private property and would have a major long-term, positive impact on the landowners.
- **Conclusion.** Both negative and positive impacts on private landowners would result from the action alternatives. Construction activities would cause short-term adverse impacts. Disruption of quiet resulting from new buildings and/or parking lots located closer to current residential properties would cause minor long-term, site-specific negative impacts. The potential increase in commercial property value through enhanced lakefront visibility, accessibility, circulation and parking would have a major long-term, positive impact for landowners.

Lake McDonald Developed Area

- **Alternatives A – Status Quo/No Action, B and C (Preferred)** would have short-term adverse impacts during construction as described under impacts common to all alternatives. Adaptive use of Stewart Motel for management-level employee housing in alternative B would have negligible, adverse impacts on adjacent landowners. Employee recreational and support facilities would be located away from private lands behind the existing Coffee Shop and should have no direct effect on the private landowners. The reconstruction of motel facilities at the Stewart Motel site in alternative C would have minor short term, adverse impacts on the adjacent landowners.
- **Conclusion.** Impacts on landowners in all alternatives would be minor and adverse. Alternatives B and C would disrupt the quiet that is adjacent to private lands during construction, resulting in minor short-term, site specific, adverse impacts on landowners.

Cumulative Impacts

There would be no cumulative impacts from projects occurring outside the park combined with any of the alternatives. Additive impacts from the Going-to-the-Sun Road rehabilitation and the commercial services plan alternatives could cause minor short-term, adverse cumulative impacts on private landowners in the park during construction.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This section describes whether any long-term management possibilities or the productivity of park resources are being traded for the immediate use of land under any of the alternatives.

Approximately 14-20 acres of land would be committed to a long-term use within the existing developed areas under all the action alternatives. New development would cause soil compaction, displaced wildlife and removal of vegetation. Noise and construction activities would also displace wildlife and disrupt visitors in the short term, but would not affect long-term productivity.

Rehabilitation of historic facilities during the short term would result in enhanced long-term productivity of historic resources by preserving them. Upgrading facilities to comply with life safety, accessibility and building codes in the short term would also result in enhancement of long-term productivity to resources and visitors.

None of the commercial service alternatives would affect long-term productivity of park resources because they are not consumptive uses and do not require additional development in the park.

UNAVOIDABLE ADVERSE IMPACTS

This section summarizes unavoidable adverse impacts. An impact is unavoidable if the action would result in impacts that cannot be fully mitigated.

Short-term adverse impacts on water quality, soils, vegetation, wildlife, natural sound, air quality, historic resources, visual resources, energy consumption, and landowners in the park would be unavoidable for all alternatives. An increase in sedimentation from erosion of disturbed soils associated with construction and/or repair would cause minor to negligible short-term, adverse impacts on water quality. Soil erosion and compaction from equipment would cause unavoidable negligible, short-term, adverse impacts on soils. Temporary disturbance and vegetation trampling during all construction work would have negligible to minor, short-term adverse impacts on vegetation. All alternatives involving construction and/or repair would introduce temporary but increased noise into the park during construction, and unavoidable adverse impacts on natural sound would be minor and short-term. An increase in dispersed dust and exhaust emissions would cause unavoidable negligible to minor short-term, adverse impacts on air quality during construction, rehabilitation and maintenance. Unavoidable minor to moderate short-term, adverse impacts on historic resources would include temporary changes to the historic setting of a historic district or a historic building due to either the presence of construction equipment and materials, or actual temporary changes to buildings during rehabilitation work. Similarly, the presence of construction equipment would result in minor short-term, adverse impacts on visual resources. Equipment and vehicles associated with construction would cause a negligible but unavoidable short-term increase in parkwide energy consumption. Temporary inconveniences to landowners from nearby construction and rehabilitation activities would cause minor short-term, unavoidable impacts.

Adverse impacts on water quality from an increased amount of hardened surfaces in the developed areas would be unavoidable. Hardened, impermeable surfaces would reduce the amount of soil and vegetation available to filter runoff, thereby increasing pollution; however, drainage control measures

would be implemented to minimize impacts on water quality. The construction of new guest and employee facilities as well as new parking lots would cause unavoidable adverse impacts on soils, vegetation, and wildlife habitat. Long-term loss of soil productivity where new facilities and parking lots would be placed would be unavoidable. Similarly, some vegetation clearing, loss or degradation of wildlife habitat, and placement of new facilities in wildlife corridors would be unavoidable.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section summarizes the irreversible and irretrievable commitments of resources that are associated with alternatives. Irreversible commitments cannot be changed over the long-term or are permanent. An impact to a resource is irreversible if the resource cannot be reclaimed, restored or otherwise returned to its condition before the disturbance. Irretrievable commitments are those that result in the loss of production or use of a resource. An impact to a resource is irretrievable if, once gone, the resource cannot be replaced.

The permanent placement of new buildings, parking lots and hardened pathways would result in an irreversible loss of between 14–20 acres of soil resources due to the long period of time that would be required to restore productivity to affected soils. The removal of a total of between 14–20 acres of vegetation for all alternatives together would cause an irretrievable commitment of vegetation as well as a loss in wildlife habitat, including federally and state-listed wildlife habitat.

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